Application of Computer and Internet In Medicine

For Post-Graduate Students

FOM-Zagazig Univetsty

تطبيقات الكمبيوتر و الانترنت في الطب

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Course Contents

No	Topics	Notes
1	Introduction & Basic Concepts	
2	Types of Web Sites	
3	Data –Information-Knowledge & Primary , Secondary ssource	
4	INFORMATION LITERACY	
5	Medical , Health Informatics , mhealth	
6	Medical Apps and Mobile Resources	
7	Research Models Exploration Form	
8	Digitization, Digitalization and Digital Transformation	
9	Infodemic and Misinformation	
10	Anatomy of a URL	
11	HOW TO FIND INFORMATION ON THE INTERNET	
12	Advanced Searching Tools	
13	How to Develop a Search Strategy:	
14	Internet Ethical Issues	
15	Open Access and Creative Commons CC	
16	Open Access Publishing Models	
17	Citing an internet site	
18	Internet and Plagiarism	
19	How to Evaluate Online information :Tools	
20	How to Evaluate Online information:Application	
21	Health On the Net Foundation Code	
22	Introduction to PubMed and MEDLINE	
23	Internet and Evidence-Based Medicine	
24	Chat-GPT & Generative AI	

Basic Concepts

The World Wide Web is a system of Internet servers that supports hypertext to access several Internet protocols on a single interface. In addition to hypertext, the Web incorporate graphics, video, and sound. .

Almost every protocol type available on the Internet is accessible on the Web. **Internet protocols** are sets of rules that allow for intermachine communication on the Internet. The following is a sample of major protocols accessible on the Web:

E-mail (Simple Mail Transport Protocol or SMTP)
Distributes electronic messages and files to one or more electronic mailboxes
Telnet (Telnet Protocol)
Facilitates login to a computer host to execute commands
FTP (File Transfer Protocol)
Transfers text or binary files between an FTP server and client
Usenet (Network News Transfer Protocol or NNTP)
Distributes Usenet news articles derived from topical discussions on newsgroups
HTTP (HyperText Transfer Protocol)
Transmits hyptertext over networks. This is the protocol of the Web.

Many other protocols are available on the Web. To name just one example, the **Voice over Internet Protocol (VoIP)** allows users to place a telephone call over the Web.

The World Wide Web provides a single interface for accessing all these protocols. This creates a convenient and user-friendly environment. Once upon a time, it was necessary to be conversant in these protocols within separate, command-level environments. The Web gathers these protocols together into a single system. Because of this feature, and because of the Web's ability to work with multimedia and advanced programming languages, the Web is by far the most popular component of the Internet.

PAGES ON THE WEB

The World Wide Web consists of files, called pages or Web pages, containing information and links to resources throughout the Internet.

Advocacy:

"An Advocacy Web Page is one sponsored by an organization attempting to influence public opinion (that is, one trying to sell ideas). The URL address of the page frequently ***ends in .org (organization)."***

Business/Marketing:

"A Business/Marketing Web Page is one sponsored by a commercial enterprise (usually it is a page trying to promote or sell products). The URL address of the page frequently ***ends in .com (commercial)."***

News:

"A News Web Page is one whose primary purpose is to provide extremely current information. The URL address of the page usually ***ends in .com (commercial)."***

Informational:

"An Informational Web Page is one whose purpose is to present factual information. The URL Address frequently ends in .edu or .gov, as many of these pages are sponsored by educational institutions or government agencies.

Examples: Dictionaries, thesauri, directories, transportation schedules, calendars of events, statistical data, and other factual information such as reports, presentations of research, or information about a topic."

Personal:

"A Personal Web Page is one published by an individual who may or may not be affiliated with a larger institution. Although the URL address of the page may have a variety of endings (e.g. .com, .edu, etc.), a tilde ***(~) is*** frequently embedded somewhere in the URL."

Data –Information-Knowledge

WHAT IS DATA?

- Data is any fact, text, graphic, image, sound …etc without meaningful relation to anything else.
- Data is information in raw or unorganised form .
- Data means the undigested observations and unvarnished facts

INFORMATION

- Information is "... all ideas, facts, and imaginative works of the mind which have been communicated, recorded , published and distributed formally or informally in any form
- = "Data which has been recorded, classified, organized, related, or interpreted within a framework so that meaning emerges."
- = to data placed in context with analysis.
- = organized data
- data + meaning = information

Knowledge

Knowledge the application of information by the use of rules

Information + application = knowledge

Knowledge = information that has been organized, internalized and integrated with experience, study, or intuition

For example, "8,000,000" and "9%" are not information; they are bits of **data**. However, "The population of Cairo in 2005 was reported to top 8,000,000 persons, a growth of 9% since 1990" is indeed **information**. Adding that information to other information and data on the funding of and expansion in public healthcare services in Cairo would help city officials to develop **knowledge** of the stresses related to delivering healthcare services.

Organizing Information

There are two approaches to organizing information and these are:-

- Format ,
- Content

A. Format refers to the medium used to present or store the information. Information comes in many configurations:

- -Paper / Print
- -Audio (cds, audio cassette)
- -Visual (Digital video disk,(DVD), video cassette, images/pictures, sculptors , charts
- Audio-visual (DVD, slide tapes)
- Formats affect the ease of access to information.

B. Content has two aspects

1. The **subject** of the information in an item

2.The **characteristics** of information in an item

B.1. THE SUBJECT OF INFORMATION

Most information is organized by subject or discipline. In a library setting, information on the same subject is grouped together. This practice is called classification and it creates order and easy retrieval of information resources in the Library

.B.2. THE CHARACTERISTICS OF INFORMATION

Information could be:

- Primary
- Secondary
- Factual
- Analytical
- Subjective
- Objective

B.2.1. PRIMARY SOURCES OF INFORMATION

- These are original materials on which other research is based.
- They are usually the first formal appearance of research results in the print or electronic literature.
- They present information in its original form, neither interpreted nor condensed nor evaluated by other writers.
- Not translated by anyone else.
- Have not been published elsewhere

PRIMARY SOURCES Examples include:

- Autobiographies
- Correspondence
- Diaries
- Interviews
- Paintings
- Photographs
- Research journal

B.2.2. SECONDARY SOURCES OF INFORMATION

- Secondary sources are edited primary sources.
- Repackaged primary sources
- They represent someone else's thinking.
- They describe, interpret, analyse and evaluate the primary sources.
- They comment on and discuss the evidence provided by primary sources.

SECONDARY SOURCES Examples include:

- Biographies
- Bibliographies
- Books
- Literary criticism & interpretation
- Historical criticism
- Review articles

B.2.3. FACTUAL SOURCES OF INFORMATION

- These are also known as reference sources of information.
- Provide quick answers to queries

- Not normally read from cover to cover
- Can be general or subject- oriented
- Can be current or retrospective
- Can be hard copy or electronic
- Made up of real facts/things that actually Exist

FACTUAL SOURCES Examples include:

- Dictionaries
- Atlases
- Handbooks
- Directories
- Almanacs/Year books
- Catalogues
- Encyclopaedias

B.2.4. ANALYTICAL SOURCES OF INFORMATION

- Information in analytical sources is usually provided by
- experts in a subject.
- Interpretations
- Analysis
- Criticisms

ANALYTICAL SOURCES Examples include:

- Reviews
- Statistical digests
- Dissertation/theses
- Political commentaries
- Books
- Subject Encyclopedias
- Reports

B.2.5. SUBJECTIVE SOURCES OF INFORMATION

- Subjective information advances a unilateral perspective on an issue for example an editorial in a newspaper Personal view(particular to a given individual)
- Can emanate from a person's emotions
- Not easily verified.

- Can be interpreted differently by other people; as opposed to "Objective"
- Information

SUBJECTIVE SOURCES Examples include:

- Individual opinion
- Newspaper editorials
- Political party manifestoes

B.2.6. OBJECTIVE SOURCES OF INFORMATION

- Objective sources of information advance a balanced or impartial perspective.
- Non-judgemental and balanced reporting
- Without bias
- Not influenced by personal feelings orinte rpretations
- Present all sides of a topic.
- Helpful in decision-making.
- Based on facts

OBJECTIVE SOURCES Examples include:

- Encyclopaedias
- Subject Dictionaries

Scholarly and Popular Sources

When writing a paper for a class, or conducting any type of research project, it is good to incorporate a variety of information sources and points of view.

Scholarly sources (sometimes called peer-reviewed sources) are written by researchers or experts in the field in order to share research findings with other researchers and scholars.

- *Pros*: peer-reviewed, supported evidence, good for building an argument
- *Cons*: can take a while to produce with the review process, often very lengthy to read and contain jargon specific to the discipline
- Examples include scholarly books, journal articles, textbooks, etc.

Popular sources are written by journalists, writers, or bloggers who aim to provide news or summarized information to the general public.

- *Pros*: good for gathering public/general opinion, can usually cover more recent events, good for background information on a topic, usually easy to read
- *Cons:* will need to evaluate for credibility, may not include citations
- Examples include newspaper articles, magazines, blogs, Twitter feeds, etc.

Watch this video from UW Libraries to learn more about Scholary and Popular Sources:

Primary and Secondary Sources

Depending on your research topic, you may want to incorporate primary and secondary sources to represent a variety of perspectives, and how understanding of an event has changed over time.

Primary sources provide first-hand accounts of an event or experience and are often made by witnesses or first recorders of these events at the time they occurred (but not always). Examples of primary sources are diaries, letters, interviews, photographs, creative works, oral histories, newspaper articles, reports, blog posts, Tweets, memes, etc.

Secondary sources are created *later* by people who *did not* experience the event first-hand, often scholars, journalists, or other professionals who analyze or interpret primary sources.

Examples of secondary sources are books, magazine and journal articles, textbooks, biographies, encyclopedias, dictionaries, literature reviews, etc.

Watch this video from UW Libraries to learn more about Primary and Secondary Sources:

Some characteristics of of scholarly and peer-reviewed articles:

- Written by a scholar or expert in the field
- Usually cite sources in the form of footnotes or bibliographies

- Language is typically that of the discipline covered (e.g. lots of jargon and acronyms)
- Usually assume that the reader has some prior knowledge of the topic or problem

Popular sources, such as magazines and newspapers, can provide background information, more up-to-date, timely content, and a wider variety of perspectives than peer-reviewed articles. And social media, such as blogs and Tweets, are valuable sources of information as well.

Scholarly, and Popular Sources

Scholarly	Popular
Scholarly sources - books and journals - disseminate research and scholarly discussions among scholars (faculty, researchers, students) in a discipline	**Popular sources** - magazines, newspapers, broadcast news, blogs, etc. - inform and entertain the general public.

What's the difference?

To disseminate original research and scholarly discussions among scholars in a discipline.	To inform and entertain about current events and popular culture.
Scholars, researchers, and students within a specific discipline.	General public.
Scholars, professors, researchers, and professionals. Their credentials are usually identified.	Journalists. Author may not be named.
Scholarly book or journal publishers, university press, or professional association (National Communication Association - NCA)	Usually commercial groups.
Mostly text; may have black and white figures, graphs, tables, or charts; few advertisements. Highly specialized; includes specialized vocabulary and jargon that is readily understood by researchers in the field, but not an average reader.	Some text; glossy, color photographs; easy to read layout; lots of advertisements. General language is used; articles may be read and understood by most people.

• Articles are usually evaluated by experts before publication (peer reviewed or refereed). • References, footnotes, or bibliographies support research and point to further research about the topic. • Authors describe methods and provide data to support research results.	• Written for everyone. • Timely coverage of current events and popular topics. • Some have editors who fact check and approve the content before publication.
• Specialized vocabulary that can be difficult for non-specialists to read. • Research and review process takes time; not as useful for current events and technologies. • Scholarly journals are expensive and may not be readily available.	• Articles selected by editors who may know little about the topic. • Authors usually do not cite their sources. • Quick deadlines mean content review is limited; Stories may come from other sources (ex. wire services) making it difficult to review the content. • Published to make a profit; the line between informing and selling may be blurred.

INFORMATION LITERACY

"the ability to find, evaluate, and use information efficiently, effectively, and ethically to answer an information need."

INFORMATION LITERACY means the set of skills, attitudes and knowledge necessary to know when information is needed to help solve a problem or make a decision, how to articulate that information need in searchable terms and language, then search efficiently for the information, retrieve it, interpret and understand it, organize it, evaluate its credibility and authenticity, assess its relevance, communicate it to others if necessary, then utilize it to accomplish bottom-line purposes (Information Competency," or "Information Fluency")

An information literate individual should be able to:

1. **Access** the needed information effectively and efficiently.
2. You know **where** and how to look for the information you need and you can find it quickly.
3. **Evaluate** information and its sources critically, and incorporate selected information into one's knowledge base.
4. You can determine if the information you found is appropriate to your research and whether the information, or its **source**, is good or bad
5. You learn from all that information you gathered.
6. **Understand** the **economic**, **legal**, and **social** issues surrounding the use of information, and access and use information ethically and legally.
7. You understand the concept of intellectual property and know the consequences of **plagiarizing** someone else's ideas.
8. You know how to **cite** your sources

Digital Literacy: Digital Literacy describes a process whereby researcher conduct research using online databases via computers or mobile devices to find answers to their personal or academic questions.

Top Ten Information Literacy Skills

1. Know when information is required
2. Know how to write a research question
3. Know where to find information
4. Determine/understand sources of information
5. Select the best source
6. Use the information
7. Organize information
8. Present information
9. Evaluate information
10. Use information in an ethical manner

Advantages Online Information Seeking

— 1.Availability in Electronic Format—The amount of information available in electronic format has vastly increased over recent years.

— 2. Accessibility—Most electronic information resources are vailable anywhere, anytime to anyone with a computer, and participants appreciated this ease and convenience.

— 3. Usability—The biggest advantage of online sources are the usability features of electronic information resources. Electronic resources are convenient, easy to use and easy to access.

— 4. Efficacy—Electronic information resources are to be timesaving,convenient, and effective.

Medical Informatics

Medical informatics is the intersection of information science, computer science, and health care. This field deals with the resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in health and biomedicine.

Medical or health informatics focuses on information technology to positively impact the patient - physician relationship through effective collection, safeguarding, and understanding of health data.

Public Health Informatics:

Definition: Public health informatics is the systematic application of information and computer science and technology to public health practice, research, and learning.

Information science: Theories in information science try to explain how we think, store, retrieve, and transmit information

Computer science: Is the systematic study of algorithmic processes that describe and transform data and information including the theory, analysis, design, efficiency, implementation and application

Information Technology: Information technology is the development and use of hardware, software, and supporting infrastructure to manage and deliver information.

Mobile Devices and Apps for Health Care Professionals

mHealth and eHealth

mHealth is the use of mobile devices such as a mobile phone or tablet to support the practice of healthcare. Essentially, mHealth applications improve the delivery of healthcare information to researchers, practitioners and patients. Patients can log, store and monitor their own health and access electronic health records on their own personal mobile devices.

eHealth on the other hand, is the healthcare practice supported by electronic processes and compared to mHealth is a much broader term. For example, eHealth includes technology such as electronic health records, patient administration systems and lab systems, all of which cannot be stored within mobile health applications

mHealth : Uses and Benefits

Need for Mobile Devices at the Point of Care

One major motivation driving the widespread adoption of mobile devices by HCPs has been the need for better communication and information resources at the point of care. Ideally, HCPs require access to many types of resources in a clinical setting, including:

• Communication capabilities—voice calling, video conferencing, text, and e-mail

• Hospital information systems (HISs)—electronic health records (EHRs), electronic medical records (EMRs), clinical decision support systems (CDSSs), picture archiving and communication systems (PACSs), and laboratory information systems (LISs) Informational resources—textbooks, guidelines, medical literature, drug references

• Clinical software applications—disease diagnosis aids, medical calculators.

Communication between individuals and health services

- Health call centres/Health care telephone help line
- Emergency toll-free telephone services
- Communication between health services and individuals
- Treatment compliance
- Appointment reminders
- Community mobilization
- Awareness raising over health issues
- Consultation between health care professionals
- Mobile telemedicine
- Intersectoral communication in emergencies
- Emergencies
- Health monitoring and surveillance
- Patient monitoring

Main Uses of mHealth & App

Information Management

- Write notes
- Dictate notes
- Record audio
- Take photographs
- Organize information and images
- Use e-book reader
- Access cloud service

Time Management

- Schedule appointments
- Schedule meetings
- Record call schedule

Health R ecord Maintenance and A ccess

- Access EHRs and EMRs
- Access images and scans
- Electronic prescribing
- Coding and billing

Communications and C onsulting

- Voice calling & Video calling
- Texting
- E-mail
- Multimedia messaging
- Video conferencing
- Social networking

Reference and Information Gathering

- Medical textbooks
- Medical journals
- Medical literature
- Literature search portals
- Drug reference guides

- Medical news

Clinical Decision-Making

- Clinical decision support systems
- Clinical treatment guidelines
- Disease diagnosis aids
- Differential diagnosis aids
- Medical calculators
- Laboratory test ordering
- Laboratory test interpretation
- Medical exams

Patient Monitoring

- Monitor patient health
- Monitor patient location
- Monitor patient rehabilitation
- Collect clinical data
- Monitor heart function

Medical Education and Training

- Continuing medical education
- Knowledge assessment tests
- Board exam preparation
- Case studies
- E-learning and teaching
- Surgical simulation
- Skill assessment tests

Telehealth and Telemedicine

Telemedicine refers solely to remote clinical services. The concept of telemedicine began as a means to treat patients who were located in remote areas. Furthermore, the connected patient now wants to spend less time in waiting rooms and receive treatment for urgent conditions when needed.

By comparison, **telehealth** refers to both clinical and remote non clinical services such as providing training and continuing medical education, therefore, is a much broader concept. Both telehealth and telemedicine can be used interchangeably, which is why there is no universal definitions for both terms.

The aim of eHealth, mHealth, telehealth and telemedicine is to improve the quality, efficiency and cost of healthcare by a variety of electronic means. All four terms play a key role in improving patient self-management via electronic processes with each term playing its own unique role.

Electronic medical records (EMR)

Electronic medical records (EMR) software is an electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one health care organization.

Who Uses EHRs?

Nearly every healthcare provider uses an EHR. This includes private practices, medical groups, and hospitals. More specifically, the vast majority of ambulatory surgical centers, specialized clinics, hospitals, and general physician specialized clinics use EHRs.

Improved Quality of Care

EMR software can potentially improve patient care in a number of significant ways, allowing you to:

- Access legible records immediately and easily
- Increase patient time by reducing paperwork and filing
- Reduce mistakes and omissions by charting at the point of care
- Eliminate mistakes with overlooked symptoms and misread prescriptions
- Eliminate mistakes with drug interactions, conflicts, and recalls
- Set alerts and reminders for follow-up visits, preventive health procedures, lab work, etc.
- Improve communication and management of treatment from multiple physicians

Medical Apps and Mobile Resources

Free Medical Apps and Mobile Resources

The use of mobile devices by health care professionals (HCPs) has transformed many aspects of clinical practice. Mobile devices have become commonplace in health care settings, leading to rapid growth in the development of medical software applications (apps) for these platforms. Numerous apps are now available to assist HCPs with many important tasks, such as: information and time management; health record maintenance and access; communications and consulting; reference and information gathering; patient management and monitoring; clinical decision-making; and medical education and training.

Examples of Medical Apps.

1. Medscape—Free. enormous content that grows continuously with each update. Find drug references, disease clinical references, clinical images, procedure videos, and more. This reference tool has its real value in the disease and condition clinical references it provides

2. Prognosis—Free. Clinical case simulation game designed for doctors and medical students updated with a new case every week (available for iPhone and Android)

3. Micromedex—Free, easy to use, straightforward, and a reliable reference for medical prescriptions

4. Epocrates—Free. The number one mobile drug reference among US doctors, and a notable rival to the Medscape app.

Check for potentially harmful interactions between up to 30 drugs at a time. Review evidence-based, patient-specific guidelines condensed for the moments of care. Consult in-depth, peer-reviewed disease content developed in collaboration with BMJ.

5. Student BMJ—Free. Download this and other articles and read them offline at your convenience (available for iPhone)

6. MedPageToday—Free. Keep up with the latest medical news.

7. PubMed for Handhelds ** (Download iOS App or Android App)
PICO search- Patient, Intervention, Comparison, Outcome
*ask*MEDLINE- free-text, natural language search

Dangers of medical apps

The *Good Medical Practice* standards requires that "doctors and students must provide a good standard of practice and care" and keep their "professional knowledge and skills up to date." Mobile medical apps will play a central role in this process.

The advent and rapid growth of the medical app market has increased the risk of using an app that is unreliable, that is not evidence based, that is trivial, or that is even dangerous.

Patient privacy

One of the biggest concerns related to the use of smartphones in clinical care is the potential breach of patients' confidentiality.

Clinical decision making

Hospitals and doctors need to ensure that they clearly designate and peer review apps that are evidence based, reliable, and up to date for use in daily clinical care, when such use is appropriate, and they should provide sufficient training to support this.

Conflict of interest

The drug industry is increasingly using medical apps for marketing, and it is often difficult to determine the origin of a medical app; whether it is funded privately or by a commercial company—for example, a drug company. Using apps developed by a drug company can raise substantial ethical issues. Such companies might use these apps for marketing purposes to influence treatment options, and they may display information in favour of their own drugs, all of which can affect patient care. .

A High Quality Medical app

There are many different medical apps. Everyone equipped with the skills to make a smartphone application could launch it on the medical app

market, and no guidelines exist stating that rules or regulations must be met before this occurs. A few questions can help you decide which app to download ..

Questions to ask before downloading an app

Clinical decision making

- Is it produced by a medical publisher? For example, apps adopted by a medical journal or publisher
- Is it regularly updated?
- Is it properly referenced?
- Are the authors listed?
- Is it possible to give feedback?
- Is the content peer reviewed?
- Has it been recommended by your tutor, university, or healthcare institution?
- Is the app's primary purpose to inform the health professional (and not patients)?

Patients' privacy

- Does the app require you to input patient specific data, and could this compromise patients' privacy?

Conflicts of interests

Do you know where the app is from? Is it produced by a drug company or a non-commercial organisation?

Research Models Exploration Form

The Most Popular Four Models are:

A. Information Search Process ISP

1. **Initiation:** Person becomes aware of what they don't know.
2. **Selection**: Person identifies a topic which gives way briefly to sense of optimism.
3. **Exploration**: This is most difficult stage. Frustration and confusion often resurfaces as individual works toward an understanding of topic.
4. **Formulation**: Turning point where uncertainty fades and understanding increases. Forming the focus is key here.
5. **Collection**: Information is gathered specific to the focus.
6. **Presentation**: The search is complete, the problem resolved, and a conclusion is reached.

B. The Research Cycle

1. **Questioning-** clarify and map out essential questions; begin by brainstorming to form a cluster (graphic organizer)
2. **Planning**- think of ways to find information that will help students answer the questions they created in the cluster. (ex. Books, Internet, etc.)
3. **Gathering**- start "gathering" information from the different sources discussed.
4. **Sorting and Sifting**- students should scan and organize the information they gathered.
5. **Synthesizing**- as they organize information, they can arrange/rearrange until patterns or "bigger" pictures begin to emerge.
6. **Evaluating**- students should decide if more research is needed at this point. (They should "determine the quality of their *information harvest*")

7. **Reporting**- students report findings and recommendations to an audience of decision makers.

C. Critical Thinking and IL Process Model

1. Encountering the Task
2. Exploring/Formulating/Questioning/Connecting
3. Searching/Locating
4. Collecting/Organizing/Managing/Monitoring
5. Analyzing/Evaluating/Interpreting/Inferring
6. Synthesis/Solving
7. Applying New Understanding
8. Communicating/Presenting/Sharing
9. Reflecting/Extending

D.The Big 6 Model and the super three

This model involves six steps. It is a process which guides students though information and technology problem solving which provides a framework for teaching and promoting informational literacy. In other words, students use the six steps to gather/research information to formulate a concept or answer on a topic.

1. **Task Definition**- determine informational problem or information related to a problem

2. **Information Seeking Strategies**- students determine possible informational sources, then select appropriate, defined task

3. **Location and Access**- use of the access tools, arrangement of the materials, points of the book, online organization of materials

4. **Use of Information**- Read information, review the material.

5. **Synthesis-** Reconstruct information to fit one's understanding and application of information

6. **Evaluation-** determine the effectiveness of the information and research along with task carried out

Digitization, Digitalization and Digital Transformation

Digitisation is the process of converting information from a physical format to digital one, digitalisation is the process of leveraging digitisation to improve business processes, and digital transformation is the transformation of business activities, processes, products, and models to fully leverage the opportunities of digital technologies.

Digitisation is the process of converting information from a physical format to digital one. It means converting something non-digital into a digital representation to be used by computer systems and automate processes or workflows. Digitisation enables to create business value, which needs data. **It helps to lay the foundation for business use cases that leverage the data.**

Examples:

- Scanning a paper document and saving it on computer's hard drive as a digital document, like PDF.
- Going from notes on paper to typing them up in an Excel spreadsheet.
- Converting from analog VHS cassettes to CD, DVD or Blu-Ray discs containing digital data.

What is digitalisation?

Digitisation and digitalisation are closely associated. They are often used interchangeably, but they are two different things.

Digitalisation **is the process of leveraging digitisation to improve business processes.** Digitalisation means making digitised information work for you. This term refers to the **use of digital technologies and data to create revenue, improve business, and create a digital culture** where digital information is at the core. It converts processes to be more efficient, productive, and profitable.

Examples:

- Uploading a PDF document from a computer's hard drive to the cloud and sharing it with many people to analyze the data;

- Converting an Excel spreadsheet to a Google Sheet stored in the cloud. The platform provides a structured environment where the documents can be shared among several users. Still, a Google Sheet itself requires human interaction to keep it up to date.
- Uploading digital movies from CD, DVD or Blu-Ray discs to online services. People can download or rent them.

Digital transformation is **the transformation of business activities, processes, products, and models** to fully leverage the opportunities of digital technologies. The main goal is to improve efficiency, manage risk or discover new monetisation opportunities. Digital transformation **is doing things in a new (digital) way.**

Examples:

- Reading the data from an online PDF or moving the data from a Google Sheet into an app or system that will analyze the data. The goal is to provide us with insights to offer new products or improve customer service. This process doesn't need a lot of human interaction because is automated. As a result, it enhances efficiency, reduces costs, and may lead to increased sales.
- Streaming movies online. Collecting data from clients to analyze it, preparing individual recommendations, offers, and advertisements.

Infodemic

"an overabundance of information – some accurate and some not *occurring during an epidemic*"

Infodemiology: **the study of distribution and determinants of information in the Internet, with the aim to inform public health and public policy."**

Misinformation is *false information* which is being shared without any purpose to make harm to anyone .

Disinformation *is false information* that shared consciously to make harm intentionally.

Types of Disinformation

1. **Misleading content**, or information and half-truths presented in such a way as to place a person or an issue in a negative light.
2. **False content**, where legitimate, truthful content is mixed with intentionally false content to give credibility to the false content.
3. **Fabricated content**, or information that is composed completely of information the source knows to be false.
4. .
5. **Manipulated content**, or content that is intentionally altered to create a false impression. An example is photo-shopping an individual into a photo at an event where he or she was were not present.
6. **False CONTEXT**, or information that implies something in a headline, photo, video clip, or caption that is not a fair representation of the body of the article or other content
7. **Imposter content**, or information from a source that intentionally impersonates a known and trustworthy source

The Four Pillars of Infodemic Management

(1) information monitoring (**infoveillance**);

(2) building **eHealth Literacy** and science literacy capacity;

(3) encouraging knowledge refinement and quality improvement processes such as **fact checking and peer-review**; and

(4**) accurate and timely** knowledge translation, **minimizing distorting** factors such as political or commercial influences

Types of Misinformation

1. Satire or parody

The first type of misinformation is satire or parody. These articles are not intended to cause harm, but rather to entertain.

If you share such content, consider including a disclaimer with the article so that everyone knows it's **intended** to be humorous.

2. Misleading content
Some news stories contain true facts, with a misleading headline designed

to fluence you into a false belief.

3. Imposter content
People pretending to be someone they are not happens very often on the internet, and is not a phenomenon restricted just to celebrities!

4. Fabricated content
Fabricated content is material that is completely false.

5. False connection
Sometimes, a news story is real but uses a headline that misleads you into thinking something false.

6. False context
During breaking news events, stories often begin to spread which are true but not related to the event in question.

7. Manipulated content
Oftentimes, images that go viral on social media have been altered. Unlike satire or parody, these are specifically designed to fool the viewer into thinking they are real.

Strategies for Spotting Misinformation

Types of Media Bias

1. Sources. Does the article balance the types of sources they quote? Or do they even cite sources at all? How does the author label their sources?

2. Omission. Does the article tell both sides of the story?

3. Loaded Language. Two types of loaded language include "purr" and "snarl" words. "Purr" words are used to invoke warm fuzzy feelings in the reader, while "snarl" words are used to provoke and anger. Does the article

you are reading cause an emotion in the reader simply by the words they used? loaded language:

emerge	latest in a string of...	offensive
serious	major	facing calls to...
refuse	turn up the heat	meaningful
crucial	critical	even though
high-stakes	offend	significant
landmark	stern talks	finally

4. Mind reading. Does the author of the article propose to know what is going on in the mind of someone they haven't interviewed?

5. Opinions. Does the article present opinions as facts? Words used opinions:

good/better/best	it suggests
bad/worse/worst	may mean that
is considered to be	would seem
it's likely that	possibly

6. Flawed logic. Does the article jump to conclusions that are unfounded given the facts?

7. Spin. Does the reporter add their own slant to facts to make them sound positive or negative?

Anatomy of a URL

A domain name is like a website's proper name (the part after the www.), businesses and organizations often have a domain name that is their corporate name (for example Microsoft's domain name is Microsoft.com). The domain suffix is the end of the domain name (the .com part) and can offer insight into the type of organization the site is linked to.

The domain suffix might also give you a clue about the geographic origin of a web site, each country also has a unique domain suffix that is meant to be used for websites within the country.

Reading the URL

This is the format of the URL:

protocol://host/path/filename

For example, this is a URL on the Web site of the U.S. House of Representatives:

http://www.house.gov/house/2004_House_Calendar.html

This URL is typical of addresses hosted in domains in the United States. Structure of this URL:

1. Protocol: **http**
2. Host computer name: **www**
3. Second-level domain name: **house**
4. Top-level domain name: **gov**
5. Directory name: **house**
6. File name: **2004_House_Calendar_html**

The URL can tell you several things about the website: creator, audience, purpose, and sometimes country of origin.

The URL is the address you type in to get to a website like the UW Libraries address **http://lib.washington.edu** or **https://www.google.se** (Sweden's Google search).

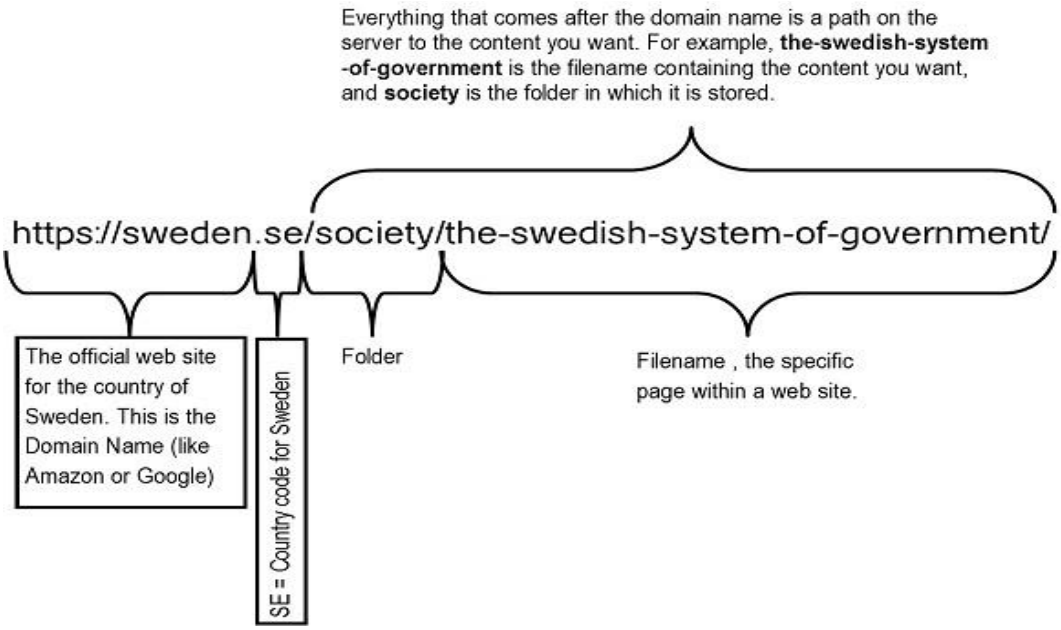

Everything that comes after the domain name is a path on the server to the content you want. For example, the-swedish-system-of-government is the filename containing the content you want, and society is the folder in which it is stored.
https://sweden.se/society/the-swedish-system-of-government/
The official web site for the country of Sweden. This is the Domain Name (like Amazon or Google)
SE = Country code for Sweden
Folder
Filename , the specific page within a web site.

Image credit: **http://uscupstate.libguides.com/c.php?g=257977&p=1721715**

Read this URL: https://wei.sos.wa.gov/agency/osos/en/voters/Pages/college_voters.aspx

From this web address you can tell:

- It's a government website (the domain suffix is .gov)
- It's from the state of Washington (.wa)
- It's domain name is for the Secretory of State Office (sos)
- The page is in English (en)
- The page was dynamically generated by a webserver which means it has special scripts and source code that tells a browser how to display the page or make it look in your browser. (.aspx file extension)

- The content of the page has something to do with college voters (voters/Pages/college_voters)
- The page is actually titled "College Voters" and it includes information for how college students living in WA State can vote.

Common Domain Suffixes in the United States

Domain Suffix Definition

A domain suffix is the last part of a domain name and is often referred to as a "top level domain" or TLD, Popular domain suffixes include ".com," ".net," and ".org," but there are dozens of domain suffixes approved by ICANN. May 6, 2011

- **Each domain suffix defines the type of website represented by the domain name.**
- **Each country has a unique domain suffix used for websites within that country.**

.com - Commercial

A company owns the site. A .com can be the company's actual Web site or it can be a Web space that a company sells to people. Commercial sites are often difficult to evaluate because companies may include educational information on portions of their sites. For example, the Duracell site information about **sustainability and disposal**. You must decided on a case-by-case basis whether a particular site's information outweighs its commercial / advertising agenda.

.org - Non-Profit Organization

If you use a non-profit organization's site, think about the organization's agenda and how it's likely to influence the way they present information.

.edu - Educational

A .edu site is from a college or university, such as the University of Washington's **http://www.washington.edu**. Usually, this means that the site has good information, but sometimes colleges and universities give Web space to students. Remember that the students may or may not check their facts when they put information up on the Web.

.gov - U.S. Government

These sites are produced by some part of the United States government (federal, state, county, or city government).

.mil - U.S. Military

These sites are produced by branches of the United States military (Army, Navy, Marines, Coast Guard, etc.)

.net Internet-Related Service

This means that the site has something to do with providing internet-related service. Local internet service providers will have .net as part of their addresses, although they might also be .com.

.k12 - K-12 School

These sites come from K-12 Schools (kindergarten through 12th grade) and can include pages created by teachers and students.

~ - Individual

If you see a tilde (~) in the Web address, you'll know that an individual created the page. Make sure that the individual cites their sources if you're considering to use the information in your research.

Country Domain Suffixes

Each country has a unique domain suffix used for websites within that country. For a complete list of country domains, visit **worldstandards' Internet country domains list**.

- .af Afghanistan
- .au Australia
- .ca Canada
- .fr France
- .jp Japan
- .mx Mexico
- .ru Russia
- .sy Syria
- .uk United Kingdom

Checking the Source

First, you need to know how to read a web address, or URL (Universal Resource Locator). Let's look at an example:

http://www.sc.edu/beaufort/library/pages/bones/bones.shtml

Here's what it all means:

- "http" means hypertext transfer protocol and refers to the format used to transfer and deal with information
- "www" stands for World Wide Web and is the general name for the host server that supports text, graphics, sound files, etc. (It is not an essential part of the address, and some sites choose not to use it)
- "sc" is the second-level domain name and usually designates the server's location, in this case, the University of South Carolina
- "edu" is the top-level domain name (see below)
- "beaufort" is the directory name
- "library" is the sub-directory name
- "pages" and "bones" are the folder and sub-folder names
- "lesson1" is the file name
- "shtml" is the file type extension and, in this case, stands for "scripted hypertext mark-up language" (that's the language the computer reads). The addition of the "s" indicates that the server will scan the page for commands that require additional insertion before the page is sent to the user.

HOW TO FIND INFORMATION ON THE INTERNET

There are a number of basic ways to access information on the Internet:

1. Go directly to a site if you have **the address**
2. Explore a **subject directory**
3. Conduct a search using a Web **search engine**
4. Explore the information stored in live **databases** on the Web, known as the "deep Web"
5. Join an e-mail discussion **group** or Usenet newsgroup
6. Subscribe to **RSS feeds**

Each of these options is described below.

1. GO DIRECTLY TO A SITE IF YOU HAVE THE ADDRESS

If you know the Internet address of a site you wish to visit, you can use a Web browser to access that site. All you need to do is type the URL in the appropriate location window.

2. BROWSE

Browsing home pages on the Web is a haphazard but interesting way of finding desired material on the Internet. Because the creator of a home page programs each link, you never know where these links might lead. High quality starting pages will contain high quality links.

3. USE A SEARCH ENGINE

Definition: A search engine is a searchable database of Internet files *collected by a computer program* (called a wanderer, crawler, robot, worm, spider). Indexing is created from the collected files, e.g., title, full text, size, URL, etc. There is *no selection criteria* for the collection of files, though evaluation can be applied to the ranking of results.

A Search Engine is made up of 3 parts.

1. Computer program – called web crawler/web spider – this searches web pages on the internet, collects the information & takes it back to its index.
2. Index –Google then creates an Index from the information that it's crawlers have found.
3. Interface – What you see on your screen

Keep in mind that spiders are indiscriminate. Be aware that some of the resources they collect may be outdated, inaccurate, or incomplete. Others, of course, may come from responsible sources and provide you with valuable information. *Be sure to evaluate all your search results carefully.*

Why use a search engine?

- **Broad -** Search engines are useful for finding information produced by governments, organizations, groups, and individuals. Examples of reliable information you can find through a search engine include freely available statistics published by a government agency or a freely available article published by a reputable news outlet.
- **Convenient -** Search engines are also useful for finding quick background information on a topic.
- **Free -** Searching is free, as is much of the information you may find. However, not all information is free and search engines can return websites that charge a fee for accessing articles or reports.
- Note: It is more challenging to narrow results effectively, find relevant material, and assess the legitimacy of information in your search results when using a search engine.

How Google displays search results

- Google Displays 10 results at a time
- Order of the words can effect the results- place more relevant words first
- Google will search for phrases first
- Beware of Sponsored links (ad) when viewing your results – these are websites that pay to appear on the page.
- The order your results are displayed by is worked out by algorithms/formulas developed by Google

4- SUBJECT DIRECTORY

Definition:

Subject Directory, is a collection of websites that include organized browsable subject categories and sub categories. Directories are human-driven and therefore have capability to deliver higher quality content. They are considered best for browsing and for search of more general nature and may include search engine for searching their own database.

When to use directories? Directories are useful for general topics, for topics that need exploring, for in-depth research, and for browsing.

There are two basic types of directories: (1) *academic / professional directories* often created and maintained by subject experts to support the needs of researchers, and directories featured on (2) *commercial portals* that satisfy the general public and are competing for traffic. Be sure you use the directory that appropriately meets your needs.

Example of an Academic Subject Directory (University Library).

Health Sciences Library (hsl) of the " UNIVERSITY of NORTH CAROLINA" (UNC.edu) https://hsl.lib.unc.edu/

This directory contains subspecialized categories as follows:

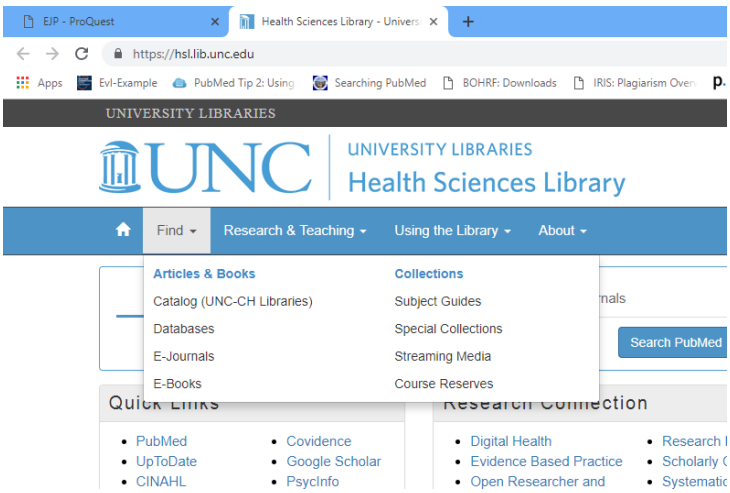
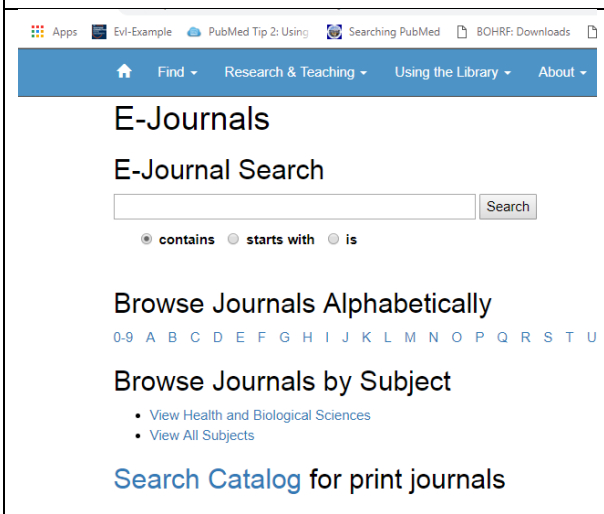
- **Find**
- Research & Teaching
- Using the library

By going to **" Find"** a drop out menu will pop up showing the following sub directories:

- articles & Books
- Catalog (UNC-CH Libraries)
- Databases
- **E-Journals**
- E-Books
- Collections
- Subject Guides
- Special Collections

- Streaming Media
- Course Reserves

If you select any one of the above subdirectory(e.g E –Journals) , you can access a comprehensive list of the required items out of it you can locate a very specific one that suite your need.

https://hsl.lib.unc.edu/ 	Go to health and science directory
https://hsl.lib.unc.edu/resources	Select resource
https://hsl.lib.unc.edu/resources/ejsearch	Select e-journals
	Select browes by subject
Select Brose by Subject	

Select Health & Biological Sciences

form this you can select-for example- "Public Health - General"
By Selecting Public Health , you can see results 1 through 50 of 524

Then you can identify basic information of ant journal , or click a link to go directly to the selected journal web site .

Try these directories

1. FSCI directory :A collection of free, quality websites from “Florida State College at Jacksonville (FSCJ)” Libraries Libguides

https://guides.fscj.edu/websites/directory

2.THE DIRECTORY OF OPEN ACCESS JOURNALS

HTTPS://DOAJ.ORG/

3.OpenDOAR is the quality-assured, global Directory of Open Access Repositories. You can search and browse through thousands of registered repositories

https://v2.sherpa.ac.uk/opendoar/

Difference between Search Engine and Subject Directory :

Search Engine	Subject Directory
It is an online tool that is used to locate or search information on WWW.	It is an online database of websites and online information set up by subject and category.
It is generally maintained and reviewed by computer robotics.	It is created, maintained and reviewed by human editors or experts.
It allows users to find or locate information on internet using phrases and keywords.	It allows users to find or locate information in internet using hierarchy.
It locates and display relevant information based on formula and algorithm using automated software program.	Directories are organized by human beings who discover new websites and relevant information by exploring internet themselves and by reviewing submitted websites.
They are used mainly for research, shopping and entertainment.	They are used mainly to search broad topics, current events, organization or business homepages, etc.
They are bigger than directories as it includes billions of web pages.	They tend to be smaller than search engine databases.
It is considered good to look for specific or complex information and its advanced features allow to refine search and improve results.	It is considered best if one wants to browse broad topics and it can give good idea about amount and type of web-based information on topic.
User search content or information on database of search engine.	User search only websites included and identified by directory.

5. EXPLORE THE DEEP WEB/Databasis Databases

Definition: The deep Web consists of information stored in searchable databases mounted on the Web. Information stored in these databases is accessible **by user query**. Search engine spiders cannot or will not index this information. In other words, this content is "invisible" to search engines. This is because spiders cannot or will not enter into databases and extract content from them as they can from static Web pages.

free and fee databases

Spiders can crawl information in static pages.

Spiders can crawl the surface layers of web pages with databases, but spiders can ***NOT***crawl the information in the databases.

A database is a collection of stored information. In terms of research, there are two types of databases.

1. databases that are free and open to anyone
2. databases that are protected by passwords or require a subscription

What is a library database?

Library databases are collections of published information from magazines, journals, and newspapers. Library databases can be general (all disciplines) or discipline-specific (e.g. a psychology database). Libraries pay subscription fees so that faculty, staff, and students can access databases. Therefore, when you use a database you may need to log in with your student ID and password.

Why use a database?

- **Reliable –** Many articles found in library databases have undergone a peer review process. Databases also provide all the information you need to evaluate a source for credibility (such as author name, publication details, and a summary).

- **Relevant –** Library databases allow you to customize your search to get the most relevant results. You can search using keywords, discipline-specific terminology, subject headings, and descriptors. You can also search by author, title, and limit your results using various criteria (date, source type, etc.).
- **Accessible –** Databases often provide access to the full-text of an article so you do not need to go to the library to retrieve it in person. Additionally, database access is purchased by libraries for its patrons which allows you to access otherwise pricey information at no charge.

When choosing which database to use, you should consider the **Discipline**, **Coverage**, and **Full-Text** of the database.

- **Discipline** means an academic area of study. Think about what majors or schools there are at your college. Databases often have a broad disciplinary focus, for example a single Education database, rather than a separate database for Elementary, Secondary and Higher Education topics.
- **Coverage** means the type of records, years of publication of the included journal articles, and number of journals included in a database. Some databases have the most recent articles included; as soon as a journal is published the articles are available in the database. Other databases have embargoed journals; the database includes many articles from a journal, but excludes the most recent six months or a year. (This is a strategy to get researchers to subscribe directly to that journal, rather than get the articles through the database. Like how some movies come out first in theaters, then six months later are available to buy or rent or stream at home). Still other databases are historic, and include journals from many years ago, even ones that are no longer actively publishing.
- **Some databases include the Full-Text** of each article indexed. That means if you find an article, you will be able to click to view or download the whole article instantly. Other databases only include article records (or some article records and some full-text); a record will provide details like author, date, source, and abstract, but then you'll have to order that article through Interlibrary Loan or another source.

Additionally, many databases have special features like **Controlled Vocabulary** and **Citation Linking** . These features are often specific to certain disciplines or databases.

- **Controlled Vocabulary** is a research term for agreed upon standard terms for different topics, subjects, or issues. There is a good reason for this. Sometimes students and researchers new to a topic might not know all the different ways to describe the topic, and by searching with the wrong keywords, they might miss important information. For example, you may search in a medical database for *flu shots* and find the result list surprisingly small. Why is this? By browsing the database's controlled vocabulary, you will find that the more common term for *flu shots* in the medical literature is *influenza vaccine*.
- **Citation Linking** connects a database article to other scholarly works that cite it. This allows the database user to find scholarly works that may be similar to the original source
-

Health-Related Databases

PsycINFO, an American Psychological Association database, provides coverage of the academic, research and practice literature in psychology as well as related disciplines such as

medicine, psychiatry, education, social work, law, and criminology. The database indexes more than 2450 journal titles, ninety-nine per cent of which are peer reviewed and indexes some resources as far back as the 1600s!

Embase is a biomedical and pharmacological bibliographic database which provides access to citations and abstracts from over 7,000 journals with indexing back to 1947. The content of Embase is somewhat similar to PubMed, but it indexes 1800 journals that are not indexed in PubMed. Although its coverage is world-wide, Embase has more of a European focus than PubMed and concentrates to a greater degree on the pharmacological literature.

Cochrane Library is a collection of databases that bring together, in one place, research on the effectiveness of healthcare treatments and interventions. The collection contains highquality independent evidence to inform healthcare decision-making. It includes evidence from Cochrane and other systematic reviews, clinical trials and more. Cochrane reviews bring the combined results of various research studies together (meta-analysis) and are recognized as the “gold standards” in the evidence hierarchy.

Web of Science (WOS) is a unique database whose primary function is to collect information for citation analysis from over 5600 journals from Science Citation Index, Social Science Citation Index and Arts & Humanities Citation Index. You can search a specific reference to discover who has cited it over the years and learn about the impact of specific papers. Each article in WOS includes the citation as well as a list of the references cited by the article and a link to who has cited it.

CINAHL or the Current Index to Nursing & Allied Health Literature is a bibliographic database containing references to articles from more than 2900 journals as well as a number of government documents, dissertations, and standards of practice. It covers nursing, biomedicine, alternative / complementary medicine,consumer health and 17 allied health disciplines. It is a valuable resource, especiallyfor identifying qualitative research studies.

Google Scholar

Google Scholar (search for scholarly literature)

is an Internet database that includes journal articles, conference papers, theses, books, pre-prints, abstracts, technical reports and other scholarly publications.

From one place, you can search across many disciplines and sources: peer-reviewed papers, theses, books, abstracts and articles, from academic publishers, professional societies, preprint repositories, universities and other scholarly organizations.

Google Scholar aims to sort articles the way researchers do, weighing the full text of each article, the author, the publication in which the article appears, and how often the piece has been cited in other scholarly literature

You can use **Google Scholar** to see who is citing an article you wrote in order to get a sense of that article's impact. (Or as a research aid, you can track the citations of any article of interest.)

Google Scholar -Content is gathered using web crawlers. Non-scholarly sources can be included in the results. Thus it should only be used only in conjunction with other methods.

A NEW FEATURE IN GOOGLE SCHOLAR

Citation metrics are available with subscribed tools such as SCOPUS, Eigenfactor, Thomson ISI, etc.

Google Scholar Citations provide a simple way for authors to keep track of citations to their articles. You can check who is citing your publications, graph citations over time, and compute several citation metrics. You can also make your profile public, so that it may appear in Google Scholar results when people search for your name.

Using of Google Scholar to formulate different citation Styles

Google scholar provides citations for articles from the search result list (currently MLA, APA, Chicago, Harvard or Vancouver). To grab a citation click on the Cite link below a search result and select from the available citation styles.

Scholar 4 results (0.01 sec)
[PDF] Some Mobile Phone Associated Health Problems among Mobile Phone Workers at Zagazig City, Sharkia Governorate
[PDF] psu.edu
ARAG Refat, SA El-Naggar, NS El-Laithy… - Zagazig Journal of …, 2008 - Citeseer
Background: Although mobile telecommunications deliver enormousbenefit to society, there are concerns whether its electric and magnetic field emissions are linked with cancer or other health hazards. Objectives: 1) determining some of the mobile phone (Mph) …
Related articles

MLA	Refat, Ahmed-Refat AG, et al. "Some Mobile Phone Associated Health Problems among Mobile Phone Workers at Zagazig City, Sharkia Governorate." Zagazig Journal of Occupational Health and Safety 1.1 (2008).
APA	Refat, A. R. A., El-Naggar, S., El-Laithy, N. S., & Aboel-Kheer, M. (2008). Some Mobile Phone Associated Health Problems among Mobile Phone Workers at Zagazig City, Sharkia Governorate. Zagazig Journal of Occupational Health and Safety, 1(1).
Chicago	Refat, Ahmed-Refat AG, SafaaA El-Naggar, Naema S. El-Laithy, and Mona Aboel-Kheer. "Some Mobile Phone Associated Health Problems among Mobile Phone Workers at Zagazig City, Sharkia Governorate." Zagazig Journal of Occupational Health and Safety 1, no. 1 (2008).
Harvard	Refat, A.R.A., El-Naggar, S., El-Laithy, N.S. and Aboel-Kheer, M., 2008. Some Mobile Phone Associated Health Problems among Mobile Phone Workers at Zagazig City, Sharkia Governorate. Zagazig Journal of Occupational Health and Safety, 1(1).
Vancouver	Refat AR, El-Naggar S, El-Laithy NS, Aboel-Kheer M. Some Mobile Phone Associated Health Problems among Mobile Phone Workers at Zagazig City, Sharkia Governorate. Zagazig Journal of Occupational Health and Safety. 2008 Jun;1(1).

How to Develop a Search Strategy:

What Is A Search Strategy?

When you design a search strategy you are planning how you will look for information. The more care and thought you put into your search strategy, the more relevant your search results will be.

A well designed search strategy:

- saves you time in the long run
- allows you to search for information in many different places
- helps you to find a larger amount of relevant information

Different strategies work better for different people. There is no need to follow every step in this tutorial. Try a few different techniques to see what works best for you.

Listing Key Words

It is making a list of the words that will help you find the information you need about your research topic. They are called "key words" because they can "unlock" the doors that will lead you to useful information.You will use them when searching through books (using indexes) and through electronic sources (using search screens in online reference sources or search tools such as search engines or directories).

If you have good key words, you'll find the kind of information you want faster. If you don't have good key words, you can waste a lot of time not finding the information you need.

What are "good key words"?

Good key words are the important words or short phrases that specifically describe your topic and closely related topics. They are not long sentences.

The S.K.I.L.L Planning Strategy

When you need to find information, you should take time to plan your search and develop a strategy. The **SKILL Planning Strategy**, outlined below will assist you to do this.

Follow the SKILL Planning Strategy to plan your search:

Step 1 - Summarise your topic in one or two sentences;
Step 2 - Keywords and phrases need to be highlighted;
Step 3 - Identify synonyms, alternate terms, phrases and variant spelling;
Step 4 - Link your keywords and phrases;
Step 5 - Locate your information.

STEP 1 - Summarise Your Topic

What specific information do you need?

Questions to assist you with your summary:

Answers to the following questions will assist you to formulate your research summary:

- What is the **main idea** of my research topic?
- What **specific ideas** am I trying to describe or prove?
- What **coverage**am I interested in: international or a specific geographical region?
- What **types of information** am I interested in, eg. statistics, patents, journal articles or conference proceedings?
- What is the **currency** of the information I require: the last 5 years or further back to the last 20 years or more.

When you have summarised your research topic, record it on the **SKILL Search Strategy Planner** included at the end of this UseIt.

For example:

SKILL SEARCH STRATEGY PLANNER
STEP 1 - Summarise your topic below
I want to find information about urban planning and sustainable environments.

STEP 2 - Keywords and Phrases should be Highlighted

Identify and **highlight** the main keywords and phrases in your summary. This will break down your sentences into keywords and phrases .

For example:I want to find information on **urban planning** and **sustainable environments**.

STEP 2 - Record The keywords and phrases		
Phrase	**Keyword**	**Keyword**
urban planning	sustainable	environments

STEP 3: Identify Synonyms & Alternate Keywords

Create a list of synonyms, alternate keywords and other phrases that describe the keywords and phrases you have highlighted.

STEP 3 - Record other synonyms & alternate keywords and phrases				
Keywords from Step 2	*urban planning*	*sustainable*	*environments*	*planning*
OR	town	ecolog*	habitat*	architect*
OR	regional	energy	locale	build*
OR	city	viable	neighbourhood	design*

STEP 4: Link Keywords & Phrases Using Connectors and Parentheses

Combine your keywords and phrases into a search strategy

Use the Connectors, **OR**, **AND**, **NOT** and **Parentheses ( )** to combine your keywords and phrases into sets and then your sets into a strategy. If you find you have too many keywords, use the additional ones to **modify** your search strategy after your initial search.

NOTE: Connectors are sometimes referred to as *Operators* or *Boolean Operators* or *Boolean Connectors*

Follow the steps below:

- Create sets by combining your synonyms with the OR connector
- Enclose each set of synonyms with parentheses ( )
- Combine the sets with either the AND or the NOT connector

STEP 5: Locate the Information by Conducting the Search

Enter your search strategy into the database to get the best results.

How To Improve Your Results?

You should think about:

Defining Key Concepts

It is important that you understand what you are looking for, and in what context terms are used. English can be a very tricky language, and an imprecise use of words can lead to irrelevant results.

To find out the meaning of words, try dictionaries or encyclopedias.

Finding Alternative Terms

To increase the likelihood of finding relevant material, you need to think about alternative terms that can be used to describe the same concepts.

You should think about:

- synonyms (eg mobile telephones, cellular telephones)
- plural/singular forms (eg women, woman)
- spelling variations(eg behaviour, behavior)
- variations of a root word (eg feminism, feminist, feminine)
- acronyms (eg chief executive officer, CEO)

How Can I Improve My Results?

Your initial searches might find not enough, or too much information. Solution?: review your search terms, and either broaden or narrow your search.

To broaden your search (i.e. increase the amount you find)

- reduce the number of concepts you are using
- use an OR search
- look for alternative terms
- use more general search terms
- use subject headings as search terms
- make sure you have used any Boolean operators correctly
- use truncation to get variations on your term, or use alternate spellings

To narrow your search (i.e. reduce the amount you find)

- use an AND or NOT search
- look for more specific alternative terms
- use subject headings as search terms
- make sure you have used any Boolean operators correctly
- use more precise terms
- remove any truncation

Building On What You've Found

Whenever you find a record that seems relevant, or an information source that is useful you should use it as an introduction to other information.

In the library books are shelved together in subject areas. This means that if you find one useful book on the shelves, there will probably be others nearby.

Catalogue and database records have subject headings or descriptors attached to them. If you search again using these terms you will find other records on similar topics.

Most academic resources contain references and bibliographies, which show where the author obtained their information. You can use these references to find other information.

Stop Words Are Useless Key Terms

Common words, prepositions, conjunctions, and common verbs such as "and, about, the, of, in, as, if, and it" are examples of stop words. Do not use stop words. They are usually ignored and vary among search tools..

Nouns And Objects Should Be Your Query Terms

Keyword types should be nouns since they are the most precise query terms. Adverbs and adjectives can help refine a search but should usually be avoided as singular terms since they are not always applicable. .

Word Stemming/Truncation And Wildcards

Use these when they can save you from having to type both the single and plural forms of a term.

Keyword Specificity

Too broad and too many results are returned, too narrow and too few are returned. Use a thesaurus, search directory, etc to help choose appropriate keywords.

Keyword Synonyms/Alternate Keywords

Have alternate keyword terms available if needed. A thesaurus, dictionary, personal knowledge, or a preliminary Net search are some places to find synonyms.

Keyword Phrasing

When phrasing, consider punctuation and other grammatical nuances. For example, spaces between words are important. If a double space is put between words and the phrase has only one, the search may fail. If two dashes were used and you had only one dash, the search tool may miss documents that have two dashes. Search tools vary in how spaces, dashes, and such are treated. Submit phrases in different ways to find the variations when you think this is needed.

Avoid One Word Searches

Use phrases and not just a singular word to help eliminate unrelated hits. Avoid using common words for search terms except in phrases. Exceptions are rare, uncommon words unlikely to be used except in proper context.

Understand Search Tool Options

Advanced Searching Tools

A. Phrase Searching

Search for words that appear next to each other by using a “phrase search”. Phrase searching uses **“ “** quotation marks.

“critical care nursing”

B. Field Searching

When search engines index web pages they look at where the words appear in a webpage and these different areas can be searched by using various prefixes before a word or phrase.

Use following prefixes can be used before your search term when searching

- **intitle:**
- **intext:**
- **site:**
- **allintitle:**
- **allintext:**
- **inurl**:

B.1. Title Searching.

• intitle:”evidence based practice”

Search all words in the title by using the **allintitle: prefix**

• allintitle: “evidence based practice” “nursing education”

B.2. Site or Domain Searching

• site:www.lib.uci.edu nursing

B.3. Search by website type

Search by type using the site: prefix

“evidence based method” site:gov

Search above will search for websites that contain the phrase "evidence based method" BUT only government websites

B.4. Search by country using the site: prefix

- **evidence-based medicine site:uk**

- **"country codes" "domain name"**

Exclude a type of website using the –site: prefix.

- **"clinical practice guidelines" -site:com**

This type of search will find websites with the phrase "clinical practice guidelines" but NOT any .com OR Commercial sites

Search in the URL field (similar to site: searching)

B.5. Search using the inurl: prefix

- **inurl:medical**

B.6. Search for related websites

To find websites that are similar or "related" to a website you already know about, use the prefix related:

- **related:www.gml.uci.edu**

B.7. Web site information

To find information on a website such as type of website, who links to your site, websites that contain reference to your website, etc, use the prefix info:

- **info:www.lib.uci.edu**

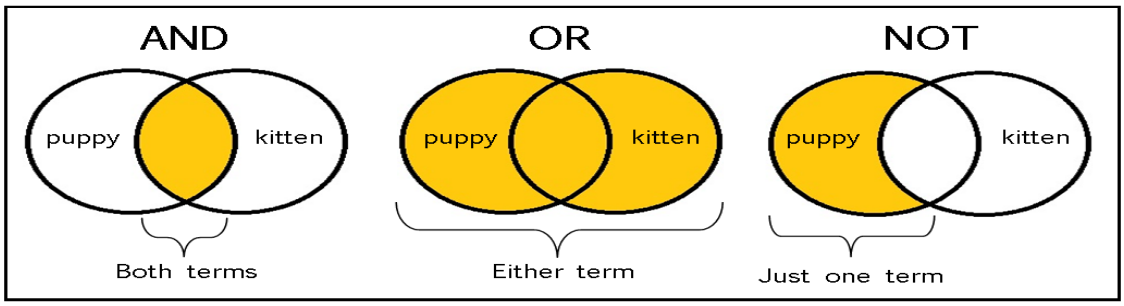
Boolean Searching on the Internet

When you use an Internet search engine, the use of Boolean logic may be manifested in three distinct ways:

1. Full Boolean logic with the use of the logical operators
2. Implied Boolean logic with keyword searching
3. Predetermined language in a user fill-in template

Boolean Operators

Boolean operators connect your search terms together to either narrow or broaden your set of results. The three basic operators are **AND**, **OR**, and **NOT**.



Use AND in a search to:

- narrow your results
- tell the database that all search terms must be present in the results

Example: cloning AND ethics AND humans will only capture results that mention all of these terms.

Use OR in a search to:

- connect two or more similar concepts
- broaden your results
- tell you the database that any of the search terms can be present in the results

Example: cloning OR genetics OR reproduction will capture results that mention any of these terms.

Use NOT in a search to:

- exclude words from your search
- narrow your search
- tell the database to ignore concepts that may be implied by your search terms

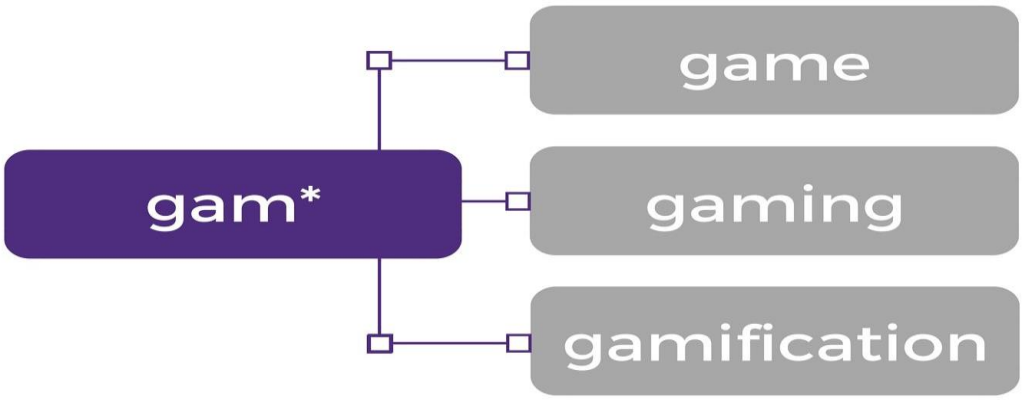
Example: cloning NOT sheep will capture all results that mention cloning minus any results that mention sheep.

Using Parentheses (Nesting)

In complex search statements involving the use of more than one Boolean operator it is necessary to use parentheses (i.e. brackets). This is also called nesting. Otherwise, keep search statements simple, and combine them later

Truncation, Wildcards & Phrases

Truncation



Truncation is a technique that broadens searches to include various word endings and spellings. To use truncation in a search, enter the root of a word and put the truncation symbol at the end. The database will return results that include any ending of that root word. For this reason, it is best not to use truncation on keyword that has a very common root

(e.g. *gen** for *genes*), or that is very likely yield irrelevant variations (e.g. *anim* = animal, animated, anima, animosity, anime*).

Example: child = child, child's, children, children's, childhood*

Wildcards

Wildcards substitute a symbol for one letter or word. This is useful if a word is spelled in different ways, but still has the same meaning.

Example 1: wom!n = woman, women

Example 2: colo?r = color, colour

Preferred truncation and wildcard symbols vary by database, but common symbols include *, !, ?, #. For assistance identifying a resource's preferred truncation symbol, look for the resource's "Help" documentation, or contact a librarian using UW Libraries' AskUs (Links to an external site.) chat service.

Truncation

Keywords may have variant endings - singular, plural and adjectives - all of which may be relevant to your subject. Using the singular form will only retrieve records which have the word in that form. In order not to miss any 'hits' (and to reduce the amount of typing!) use truncation.

Type in the start of the word plus the truncation symbol ($ * ? #) depending on which database you are using to retrieve all the variant forms of the word. For example:

Child*
Couns*
Wom*

Use truncation with care. Truncating inappropriately retrieves false 'hits'

Phrases

Phrase searching allows you to specify that adjacent words be searched together instead of as single words. To do this, use parentheses or quotes around search words.

Example: "genetic engineering" will return only results that contain this exact and entire phrase.

'Snowballing' (Moving from specific to general)

Once you have identified some, or even one, useful reference it can lead you on to other similar ones. Note the keywords assigned to your reference(s) in the database. Use these to run a new search. Also don't forget to search for other writings by the author, and also follow up on the references your author has used in their bibliography.

Internet Ethical Issues

Copyright , Plagiarism and Citation

I. Copyright

The Internet has been characterized as the largest threat to copyright since its beginning.

What is protected on the WWW?

The unique underlying design of a Web page including:

- Links - original text - graphics - audio - video
- html, other unique markup language sequences
- List of Web sites compiled by an individual or organization.

When creating a Web page, you CAN:

Link to other Web sites. [It is wise to ask permission]. You need to cite source, as you are required to do in a research paper, when quoting or paraphrasing material from other sources. Use free graphics on your Web page. If the graphics are not advertised as "free" they should not be copied without permission.

When creating a Web page, you CANNOT:

- Put the contents of another person's or organizations web site on your Web page
- Copy and paste information together from various Internet sources to create "your own" document. [You CAN quote or paraphrase limited amounts, if you give credit to the original source and the location of the source. This same principle applies to print sources, of course.]
- Incorporate other people's electronic material, such as e-mail, in your own document, without permission.
- Forward someone's e-mail to another recipient without permission
- Copy and paste others' lists of resources on your own web page
- Copy and paste logos, icons, and other graphics from other web sites to your web page (unless it is clearly advertised as "freeware." Shareware is not free).

The Internet and Copyright

A .Copyright © (All Rights Reserved)

Copyright is a legal right that protects creative work. All Rights Reserved copyright © means that the copyright **holder** reserves for their own use, all of the rights provided by copyright law. **Users** are not allowed to republish the work without copyright holder's explicit permission.

Copyright protects original works of expression that are fixed in a tangible medium. Protection is automatic and attaches to work upon its creation.

- **Copyright includes all of these exclusive rights:**

- **to reproduce the work**
- **to prepare derivative works based upon the original work**
- **to publicly distribute copies of the work**
- **to publicly perform the work**
- **to publicly display the work**

B. Open Access OA and Open Licenses

Open access (OA) refers to making content available to readers without charge and giving the permission of the copyright owner to reuse content. Openness of the content is a permission for users under a specific licenses called Creative Commons Licenses (CC) .

Open Access

Open access is an international movement that seeks to grant free and open online access to academic information. Open access is a publishing model for scholarly communication that makes research information available to readers at no cost, as opposed to the traditional subscription model in which readers have access to scholarly information by paying a subscription, usually via libraries.

C. Public Domain : Public domain is the purest form of open/free since no one owns or controls the material in any way (PD).

Public Domain	Open License	All Rights Reserved
Copyright ownership waived.	Copyright ownership retained.	Copyright ownership retained.
Author gives away rights to the public.	Author grants rights in advance.	Author does NOT grant rights to the public.
It is not mine. I give up my right as an author. You don't even have to	It is mine but I do allow you to take my material. No need to ask for my	It is mine. I do NOT allow you to take this material and

cite me although I would appreciate it.	permission to use it because it is already granted -just be sure to make proper attribution to me.	repurpose it. You definitely need to ask for my permission to use it.
Most open.		Most closed.
	⟷	

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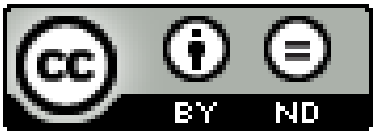
This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation. Recommended for maximum dissemination and use of licensed materials.

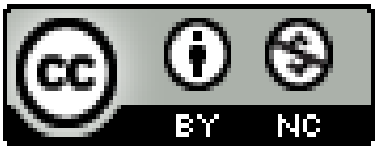
2. Attribution-ShareAlike CC BY-SA

This license lets others remix, tweak, and build upon your work even for commercial purposes, as long as they credit you and license their new creations under the identical terms.



3.Attribution-NoDerivs CC BY-ND

This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to you.



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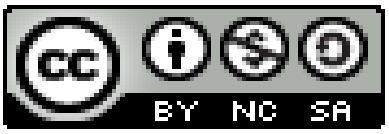
This license lets others to use your work non-commercially, and although their new works must also acknowledge you and be non-commercial.



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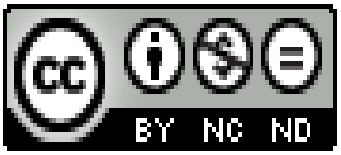

6.Attribution-NonCommercial-NoDerivs

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No Rights Reserved" CC0 "all rights granted" public domain.

CC0 enables scientists, educators, artists and other creators and owners of copyright- or database-protected content to waive those interests in their works and thereby place them as completely as possible in the public domain, so that others may freely build upon, enhance and reuse the works for any purposes without restriction under copyright or database law.

Open Access Publishing Models

There are two primary ways for delivering OA: OA Journals (or "Gold OA"), and OA Repositories (or "Green OA").

	Green OA	Gold OA
Definition	Green OA refers to **self-archiving/depositing** published or pre-publication works in an **institutional repository**, a	Publishing works in open access **journals**. The works can be freely accessed via publisher's website, and *sometimes* an article

	disciplinary archive, or a **personal website**. Authors provide access to preprints or post-prints (with publisher permission) for free public use. e.g., arXiv.org	processing charge (APC) is applied after the work has been accepted and published. e.g., Public Library of Science (PLoS), BioMed Central (BMC)
Peer-Review	Do not conduct peer review themselves, but articles are usually peer-reviewed elsewhere before publication (within institution, or in peer-reviewed journals).	Most OA journals conduct peer review.
Cont…..	**Green OA**	**Gold OA**
Charge	Do not charge.	APC payable by authors (usually covered by institutions or funders).
Availability	For published articles, embargo period usually applied (6, 12 or 24 months) after publishing online.	Immediate available after publishing online.
Copyright	Cannot generate permissions for re-use. Copyrights of works may have been transferred to publishers.	Can generate permissions for re-use. Copyrights of works are usually retained by authors.

Green OA : Subject-specific OA Repositories

A disciplinary repository (or subject repository) is an online archive containing works or data associated with these works of scholars in a particular subject area. Disciplinary repositories can accept work from scholars from any institution. A disciplinary repository shares the roles of collecting, disseminating, and archiving work with other repositories, but is focused on a particular subject area. These collections can include academic and research papers.

Examples of Subject-specific OA Repositories

1. **arXiv.org** Owned and operated by Cornell University, arXiv.org provides e-print archive and distribution service in the fields of physics, mathematics, computer science, quantitative biology, quantitative finance and statistics.

2. **PubMed Central (PMC)** is a free full-text archive of biomedical and life sciences journal literature at the U.S. National Institutes of Health's National Library of Medicine.

3. **Social Science Research Network (SSRN)** is devoted to the rapid worldwide dissemination of social science research and is composed of a number of specialized research networks in each of the social sciences.

4. **CogPrints** is an electronic archive for self-archive papers in the areas of Psychology, Neuroscience, Linguistics, Computer Science, Philosophy, Biology, Medicine, Anthropology, etc.

Finding CC Contents

1- **Use search.creativecommons.org**

https://search.creativecommons.org/

2-**Wikimedia Commons**

Wikimedia Commons is a collection of 50,101,987 freely usable media files to which anyone can contribute

https://commons.wikimedia.org/wiki/Main_Page

3- **Finding Public Domain & Creative Commons Media**

A guide By Harvard Library containing links to a group of the most credible images, audio an video sites .

https://guides.library.harvard.edu/Finding_Images

4. **Public Domain Photos** (https://unsplash.com/)

NB-Articles and other material in any internet site usually include an explicit copyright statement. In the absence of a copyright statement, users should assume that standard copyright protection applies, unless the article contains an explicit statement to the contrary. In case of doubt, contact the webmaster or the publisher to verify the copyright status of the work.

Copyright in the Egyptian Laws

Copyright is a form of protection provided by the laws (in Egypt **: Law No. 82 of 2002- Pertaining to the Protection of Intellectual Property Rights)**

Article 138/8: * Public domain: Domain including all works initially excluded from protection or works in respect of which the term of protection of economic rights expires, in accordance with, the provisions of this Book.

Article 140: Protection under this Law is conferred to authors of literary and artistic works and particularly the following works:

- Books, booklets, articles, bulletins and any other written works;
- Computer programs;
- Databases, whether readable by computer or otherwise;
- Lectures, speeches, sermons and any other oral works when recorded;
- Dramatic and dramatico-musical works, and pantomimes;
- Musical works with or without words;
- Audiovisual works;
- Works of architecture;
- Works of drawings with lines or colours, sculpture, lithography, printing on textile and any other similar works of fine arts;
- Photographic and similar works;
- Works of applied and plastic arts;
- Illustrations, maps, sketches and three-dimensional works relating to geography, topography or architectural designs;

- Derivative works, without prejudice to the protection prescribed for the works from which they have been derived. Protection shall cover also the title of the work if it is inventive.

Article 141: **Protection** shall **not cover** mere ideas, procedures, systems, operational methods, concepts, principles, discoveries and data, even when expressed, described, illustrated or included in a work. In addition, protection shall **not cover** the following:

(1) Official documents, whatever their source or target language, such as laws, regulations, resolutions and decisions, international conventions, court decisions, award of arbitrators and decisions of administrative committees having judicial competence.
(2) News on current events which are mere press information.

However, collections of the above shall enjoy protection if the selection of such collection is creative by virtue of its arrangement or any other personal effort deserving protection.

Article 161: The economic rights relating to works of joint authorship shall be protected throughout the lives of all co-authors and for 50 years from the death of the last survivor.

II. Internet and Plagiarism

Plagiarism is using the words or ideas of others and passing them off as your own. Plagiarism is a type of intellectual theft.

If you use someone else's words or ideas and you don't tell the reader where you got your information, the reader will logically assume the words and ideas are your original work.

- It's misleading
- It’s dishonest.
- It's cheating.
- It's plagiarism

Common Forms of Plagiarism

1.Copying

- Using the same words as the original text without acknowledging the source or without using quotation marks is plagiarism.

- Putting someone else's ideas into your own words and not acknowledging the source of the ideas.
- This includes copying materials, ideas or concepts from a book, article, report or other written document, presentation, composition, artwork, design, drawing, circuitry, computer program or software, website, internet, other electronic resource, or another person's assignment, without appropriate acknowledgement.

2. Inappropriate paraphrasing .

- Using the exact words of someone else, with proper acknowledgement, but without quotation marks.
- Changing a few words and phrases while mostly retaining the original structure and/or progression of ideas of the original, and information without acknowledgement. **.**
- This also applies in oral presentations where someone paraphrases another’s ideas or words without credit.

3. Relying too much on other people’s material

- Relying too much on other people's material; that is, repeated use of long quotations (even with quotation marks and with proper acknowledgement).
- Using your own ideas, but with heavy reliance on phrases and sentences from someone else without acknowledgement.
- Piecing together quotes and paraphrases into a new whole, without appropriate referencing.

4. Inappropriate citation

- Citing sources which have not been read, without acknowledging the 'secondary' source from which knowledge of them has been obtained.
- 'Padding' reference lists with sources that have not been read or cited within assignments.

5. Self-plagiarism

- 'Self-plagiarism’ occurs where an author republishes their own previously written work and presents it as new without referencing the earlier work, either in its entirety or partially.

- Self-plagiarism is also referred to as 'recycling', 'duplication', or 'multiple submissions of research findings' without disclosure.
- In the student context, self-plagiarism includes re-using parts of, or all of, a body of work that has already been submitted for assessment without proper citation.

The 10 most common types of plagiarism https://www.turnitin.com/static/plagiarism-spectrum/	
Type	**Description**
(1) Clone:	Submitting another's work word-for-word, as one's own
(2) CTRL-C:	Contains significant portions of text from a single source without alteration
(3) Find – Replace:	Changing key words and phrases but retaining the essential content of the source
(4) Remix:	Paraphrases from multiple sources, made to fit together
(5) Recycle:	Borrows generously from the writer's previous work without citation
(6) Hybrid:	Combines perfectly cited sources with copied passages without citation
(7) Mashup:	Mixes copied material from multiple sources
(8) 404 Error:	Includes citations to non-existent or inaccurate information about sources
(9) Aggregator:	Includes proper citation to sources but the paper contains almost no original work
(10) Re-	Includes proper citation, but relies too closely on the

tweet:	text's original working and/or structure.

III. Citation

Acknowledge your source

There are a variety of reasons for acknowledging the sources upon which you have built your own work. The key reasons:

- To distinguish your own work from that of your sources.
- To receive credit for the research you've done on a project.
- To establish the credibility and authority of your knowledge and ideas.
- To place your own ideas in context, locating your work in the larger intellectual conversation about your topic.
- To permit your reader to pursue your topic further by reading more about it.
- To permit your reader to check on your use of source material

You do not need to acknowledge

- information that is common knowledge
- your own ideas, discoveries and reasonings

You may acknowledge

- information available from a wide variety of sources that is especially well addressed in a particular source

Five Types of Information You Must Acknowledge

1. direct quotations
2. paraphrases and summaries
3. arguable statements
4. statistics, charts, tables, and graphs
5. images, photos and graphics

Using citation styles

Most disciplines use the APA style (American Psychological Association). It is the most important standard for the social sciences. In health and medicine the Vancouver style is preferred.

Managing and processing your sources

There are various tools to manage your sources, such as RefWorks, Mendeley and Zotero.

Citing Resource By Vancouver style

The Vancouver style of referencing is a numbered referencing style predominantly used in the health science field.

This style is also known as National Library of Medicine (NLM) or ICMJE style. https://www.ncbi.nlm.nih.gov/books/NBK7256/

Vancouver is a numbered referencing style commonly used in medicine and science, and consists of:

- Citations to someone else's work in the text, indicated by the use of a number
- A sequentially numbered reference list at the end of the document providing full details of the corresponding in-text reference

1. Electronic journal

Electronic journal articles

- The word [Internet] in square brackets should be inserted after the abbreviated journal title.

- The date cited [in square brackets] must be included after the date of publication.
- The URL (web address) must be included at the end of the reference

Style: Author AA, Author BB. Title of article. Abbreviated title of Journal [Internet]. Date of publication YYYY MM [cited YYYY Mon DD];volume number(issue number):page numbers. Available from: URL……

Example: Stockhausen L, Turale S. An explorative study of Australian nursing scholars and contemporary scholarship. J Nurs Scholarsh [Internet]. 2011 Mar [cited 2013 Feb 19];43(1):89-96. Available from: http://search.proquest.com.ezproxy.lib.monash.edu.au/docview/858241255?accountid=12528

2. Books :

Style) Author AA. Title of book. # edition [if not first]. Place of Publication: Publisher; Year of publication. Pagination.
b.) Author AA. Title of web page [Internet]. Place of Publication: Sponsor of Website/Publisher; Year published [cited YYYY Mon DD]. Number of pages. Available from: URL DOI: (if available)

Example) Carlson BM. Human embryology and developmental biology. 4th ed. St. Louis: Mosby; 2009. 541 p.
b.) Shreeve DF. Reactive attachment disorder: a case-based approach [Internet]. New York: Springer; 2012 [cited 2012 Nov 2]. 85 p. Available from:

3. WEB SITES AND OTHER ONLINE REFERENCES

Web Site (Basic Format)

Author Surname Initials (if available). Title of web site [Internet]. Place of Publication: Publisher; Date of First Publication [Date of Last Update; Date of Access]. Available from: URL

Note: Websites vary considerably in the amount of publication information supplied. Be sure to look for information such as author name in a variety of places – it may be given somewhere on the web page you wish to cite, on the webs site's home page, or elsewhere within the site.

If you cannot find the place of publication, publisher, or date of first publication, use: [Place unknown], [Publisher unknown], or [date unknown]. Other elements, such as author, can simply be omitted if they are not specified.

> **Example** : Bellham S. Histology–World! [Internet] [Publisher unknown]: Histology–World; [date unknown] [cited 2010 Feb 20]. Available from: http://www.histology-world.com

4.AN ONLINE IMAGE

Example :

Delisle GJ, Tomalty L, Queens University. Encapsulated streptococcus pneumonia [image on the Internet]. [Date Unknown] [cited 2010 Mar 2]. Available from: http://pathmicro.med.sc.edu/fox/Spneumo.jpg

Centres for Disease Control and Prevention. Shingles on face. [Image on internet]. 2011 [updated 2011 Jan 10; cited 2012 Nov 6]. Available from: http://www.cdc.gov/shingles/about/photos.html

Source https://www.nlm.nih.gov/bsd/uniform_requirements.html

Citation management tools—sometimes called citation managers, reference management tools, or reference managers—enable you to store, organize, annotate, share your references for research, and create bibliographies or reference lists. They can also be used with a word

processor to automatically insert in-text citations and format bibliographies according to your desired citation style. While citation management tools may take some time and patience to learn, once you're able to grasp the mechanics behind the tools, they will be your greatest assistant in organizing and generating citations.

Choosing a Citation Manager

UW Libraries provides support for three citation managers: EndNote Basic, Mendeley, and Zotero. Choosing a citation manager depends on your own preferences and work style. You can also check with other researchers in your department, discipline, or research team to see if a particular citation management tool is already popular in your field of research.

This comparison chart (Links to an external site.) and the Citation Styles & Tools Research GuideLinks to an external site. can help you decide which one is best for you.

Zotero zotero

ZoteroLinks to an external site. is a desktop-based citation management tool that provides a "save to" widget, works with Microsoft Word and Google Docs, allows for group collaboration for shared sources, and gives users unlimited free citations and storage up to 300MB. Additional storage is billed annually.

Mendeley MENDELEY

MendeleyLinks to an external site. is a desktop-based citation management tool that also provides a "save to" widget, works with Microsoft Word, allows you to annotate PDFs, lets you create 5 groups with up to 25 members each, and gives users unlimited free citations and storage up to 2GB. Additional storage is billed monthly.

EndNote Basic

EndNote BasicLinks to an external site. is a web-based citation management tool that has a "save to" widget, provides a direct export option from the UW catalog and some databases, works with Microsoft Word, lets you share folders, and is free of cost.

How to Evaluate the Credibility of Online Resources

Why Evaluate Web Sites?

The World Wide Web is an effective means of disseminating information, but the fact that anyone who has access to a Web server can create and maintain a Web site on *any* . Explicit standards and editorial control are often absent in Web publishing. Also, some people delight in producing "spoof sites" containing misinformation that the inexperienced or unwary user might be tempted to accept as truth.

Commonly used evaluation tools:

1. Applying the CRAAP Test

Currency: ***The timeliness of the information*.**

- • When was the information published or posted?
- • Has the information been revised or updated?
- • Does your topic require current information, or will older sources work as well?
- Are the links functional?

Relevance: ***The importance of the information for your needs*.**

- • Does the information relate to your topic or answer your question?
- • Who is the intended audience?
- • Is the information at an appropriate level (i.e. not too elementary or advanced for your needs)?
- • Have you looked at a variety of sources before determining this is one you will use?
- • Would you be comfortable citing this source in your research paper?

Authority: ***The source of the information.***

- • Who is the author/publisher/source/sponsor?
- • What are the author's credentials or organizational affiliations?
- • Is the author qualified to write on the topic?
- • Is there contact information, such as a publisher or email address?
- Does the URL reveal anything about the author or source? examples: .com .edu .gov .org .net

Accuracy: ***The reliability, truthfulness and correctness of the content.***

- • Where does the information come from?
- • Is the information supported by evidence?
- • Has the information been reviewed or refereed?
- • Can you verify any of the information in another source or from personal knowledge?
- • Does the language or tone seem unbiased and free of emotion?
- • Are there spelling, grammar or typographical errors?

***Purpose*: *The reason the information exists*.**

- • What is the purpose of the information? Is it to inform, teach, sell, entertain or persuade?
- • Do the authors/sponsors make their intentions or purpose clear?
- • Is the information fact, opinion or propaganda?
- • Does the point of view appear objective and impartial?
- • Are there political, ideological, cultural, religious, institutional or personal biases?

2.TRAAP

This test is especially useful for **academic and scholarly texts**, but you can keep it in mind when looking at all sources.

***Timeliness*:** the timeliness of the information

- When was the information published or posted?
- Has the information been revised or updated?
- Have newer articles been published on your topic?
- Does your topic require current information or will older sources also work?
- Are the links functional?

***Relevance*:** the importance of the information for your needs

- Does the information relate to your topic or answer your question?
- Who is the intended audience?
- Is the information at an appropriate level (i.e. not too elementary or advanced for your needs)?
- Have you looked at a variety of sources before determining this is the one you will use?
- Would you be comfortable using this source for a research paper?

***Authority*:** the source of the information

- Who is the author / publisher / source / sponsor?
- What are the author's credentials or organizational affiliations?
- What are the author's qualifications to write on the topic?
- Is there contact information, such as a publisher or email address?
- Does the URL reveal anything about the source? (More info about URLs and Internet DomainsLinks to an external site.)

***Accuracy*:** the reliability, truthfulness, and correctness of the information

- Where does the information come from?
- Is the information supported by evidence?
- Has the information been refereed or peer-reviewed?
- Can you verify any of the information in another source or from personal knowledge?
- Does the language or tone seem biased and free of emotion?
- Are there spelling, grammar, or other typographical errors?

***Purpose*:** the reason the information exists

- What is the purpose of the information? Is it to inform, teach, sell, entertain, or persuade?
- Do the authors / sponsors make their intentions or purpose clear?
- Is the information fact, opinion, or propaganda?
- Does the point of view appear objective and impartial?
- Are there political, ideological, cultural, religious, institutional, or personal biases

3.Strategies for Evaluating Information: The 5Ws

The 5Ws work especially well with online sources, but try them out any time you encounter a new source.

Who? Authority

- **Who is the author** (individual, organization)?
- What are the author's qualifications (occupation, years of experience, position, education, other)?
- What is the author's institutional affiliation, if any? (educational institution, nonprofit organization, company, other)?
- Is contact information given so that you can contact the author for clarification or more information?
- Is there an *About Us* section?
-

What? Accuracy

- **What is the purpose of the content?**
- Does the content appear to be well-researched?
- Are there editors and fact checkers? Did the item go through a *peer-review* or *refereed* process?
- Are there references to sources of information supporting any statements made or viewpoints held?
- Are the facts documented so that you can verify the content in another source?
- Does the item include grammatical, spelling, or typographical errors?
- If Websites are suggested or linked to, are they quality sites?

When? Currency

- **When was the item written or published?**
- Is it important that the info you need be right up to date?
- If a Website,
    - When was the site created?
    - When was the content last updated?
    - Is it current enough for your needs?
    - Are there any "dead" links?

Where? Publisher

- **Where is the content from?**
- How reputable is the publisher?
- Does the publisher take responsibility for the content?
- Is the item published as a peer-reviewed/refereed journal, scholarly journal, magazine, or news source?
- If a website, where is it published? What is the domain?.
    - .com = a commercial site
    - .gov = a U.S. government site
    - .org = nonprofit organization site
    - .edu = an educational site
- Will it be there tomorrow? Is it a stable site that will continue to exist?

Why? Purpose & Objectivity

- **Why does the source exist?**
- Is there a statement of mission, purpose, target audience?
- Does it provide many opinions? Is it balanced?
- Does it contain mostly opinions or facts?
- Is there bias in the information and opinions presented?
- Is it selling? Promoting? Ranting? Sponsoring?
- Does the source represent the agenda of a political, religious, or social group or institution?
- If the source has advertisements, are they clearly differentiated from the informational content?

4: SIFT

SIFT is a 4-step method to quickly ascertain the accuracy of social media posts and websites by using fact-checkers' strategies of cross-referencing information

Stop

- Before you share a post or a Tweet **STOP**. Ask yourself whether you know and trust the source of the information. If you don't, use the other steps below to get a sense of what you're looking at. Don't read it or share it until you know what it is.

Investigate the source

- What is the source's or author's reputation?
- Check out the user profile. Does this person or organization seem to be an expert in the field, a legitmate organization or a reputable media outlet?
- What does Wikipedia (Links to an external site.) say about this organization or publication? Most major organizations and publications have a Wikipedia page. Wikipedia can often tell you what is the purpose of the organization and any political slant it may have that might color the information it disseminates.

Find better coverage

Can you find similar coverage of the topic elsewhere? Use Google (Links to an external site.) to see if there are other more trusted sources (newspapers, reputable organizations, experts) that corroborate the information. If a story is true there should be many sources covering it.

Trace claims, quotes and media to the original context

- Check the date. With fast-moving stories such as the Covid-19 pandemic, information changes daily. Click through to the original source post.
- Does the original story substantiate the claim in the post? Keep in mind that the framing of a story can be deceptive. Click through to the original source post and check.
- Find the original image.

5. SMART?

Determine if your data/statistics are SMART before believing what is reported.

Source: Who or what is the source?

- Who collected the data?
- Can you trace the data back to the original source? The data source and the reporter/citer/publisher are not always the same (e.g. advocacy organizations often publish data that were produced by some other organization).
- What are the credentials of the original source?
- If the source is unclear, be skeptical about the data/statistics.

Motive: Why do they say so?

- What was the purpose of the collection or study?
- Who was the intended audience for or users of the data/statistics?
- Was it collected as part of the mission of an organization, for advocacy, or for business purposes?
- Do they have a special interest or particular point of view that may cause them to slant data/statistics to suit their beliefs or causes?
- Biased sources can be accurate, but you need to check them carefully.

Authority: Who produced the data/statistics?

- What are the author's/data producer's credentials?
- How widely known or cited is the producer?
- Who else uses the data?
- Is the producer an expert on the subject?
- If an individual, what organizations are they associated with? Could that association affect the work?

Review: Go over the collection methods & completeness carefully.

- What methodology was used? Is the methodology documented?
- How are the data collected - count, measurement, or estimation?
- If a survey:

  - What was the total population? How does that compare to the size of the population it is supposed to represent?
  - What methods were used to select the population included? How was the population sampled?
  - What populations were included and/or excluded?
  - What was the response rate?
- Are there any notable errors in facts or conclusions?
- Is the information current enough? Remember that there is often a delay between data collection and data reporting because analysis and publication take time.

Two-source Test: Double check everything if possible.

- Do other sources provide similar numbers?
- Research the subject in **journal articles and newspapers**, by interviewing others, and search online.
- Does your two-source test confirm or contradict the data/statistics?

Health On the Net Foundation Codem (HON)

1. Authoritative

Indicate the qualifications of the authors: Any medical or health advice provided and hosted on this site will only be given by medically trained and qualified professionals unless a clear statement is made that a piece of advice offered is from a non-medically qualified individual or organisation.

2. Complementarity

Information should support, not replace, the doctor-patient relationship: The information provided on this site is designed to support, not replace, the relationship that exists between a patient/site visitor and his/her existing physician.

3. Privacy

Respect the privacy and confidentiality of personal data submitted to the site by the visitor: Confidentiality of data relating to individual patients and visitors to a medical/health Web site, including their identity, is respected by this Web site.

The Web site owners undertake to honour or exceed the legal requirements of medical/health information privacy that apply in the country and state where the Web site and mirror sites are located.

4. Attribution

Cite the source(s) of published information, date and medical and health pages:Where appropriate, information contained on this site will be supported by clear references to source data and, where possible, have specific HTML links to that data. The date when a clinical page was last modified will be clearly displayed (e.g. at the bottom of the page).

5. Justifiability

Site must back up claims relating to benefits and performance: Any claims relating to the benefits/performance of a specific treatment, commercial product or service will be supported by appropriate, balanced evidence in the manner outlined above in Principle 4.

6. Transparency

Accessible presentation, accurate email contact: The designers of this Web site will seek to provide information in the clearest possible manner and provide contact addresses for visitors that seek further information or support. The Webmaster will display his/her E-mail address clearly throughout the Web site.

7. Financial disclosure

Identify funding sources: Support for this Web site will be clearly identified, including the identities of commercial and non-commercial organisations that have contributed funding, services or material for the site.

8. Advertising policy

Clearly distinguish advertising from editorial content : If advertising is a source of funding it will be clearly stated. A brief

description of the advertising policy adopted by the Web site owners will be displayed on the site.

Web Page Evaluation Worksheet	
Title of Web Page	
URL of Web Page	
1. **AUTHORITY**	
What kind of domain? **.com, .edu, .gov, .org**	
Who is the author or publisher? **(How can they be contacted?)**	
Are they a qualified authority on the topic? **(What are their qualifications?)**	
Is there a link to more information about the organization, company, or institution?	
Who sponsors the Web page? **(What is their agenda or motivation?)**	
2. CONTENT	
What is the subject or topic?	
Is the information complete and reliable? **(Primary or Secondary?)**	
Does the information seem biased?	
3. CURRENCY	
What is the date of the Web page? **When was the web page last updated?** **(Is the information still relevant?)**	
Does the date matter to the content?	
3. PURPOSE	
What is the intent or purpose of the Web page? **(Information? Entertainment? Sales? Personal?)**	
Who is the Web page's target audience?	
3. USABILITY	
How is the Web page organized?	
Is the content presented error-free? **(Punctuation? Spelling?)**	
Is the reading level appropriate for the intended audience?	
Does the Web page take a long time to load?	
Do you have any other observations?	

Introduction to PubMed and MEDLINE

PubMed is a database of over 25 million biomedical article citations created and maintained by the National Library of Medicine. MEDLINE is the subset of PubMed records which have been indexed by the National Library of Medicine and have had Medical Subject Headings (MeSH) terms applied. Currently approximately 80% of PubMed records are indexed for MEDLINE .

Subject Coverage: Biomedicine and the health care sciences. MEDLINE also covers medically relevant fields of the biosciences such as microbiology, immunology, virology and neuroscience .

Publication Date Coverage: Approximately 1950 to present. The earliest citations in PubMed date back to the late 1940s, but consistent coverage and indexing began in earnest in the early 1950s.

Record Content: PubMed records are comprised of fields, or "data elements", such as Author, Title, Publication Date, Abstract, MeSH Terms, etc. A PubMed record can have as many as 60 different fields*. It is important to note that PubMed is a citation database, not a full text database so when searching PubMed, you are searching the citation information contained in these fields only, not the entire text of the article.*

MeSH: The Key to MEDLINE

The key to MEDLINE is a controlled vocabulary system called the Medical Subject Headings (MeSH).

MeSH terms impose uniformity and consistency to the indexing of biomedical literature and are applied to citations when they are indexed for MEDLINE. This system offers three main advantages:

1. MeSH indexing facilitates the retrieval of relevant articles even when authors have used different words or spellings to describe the same topic.

For example:

- *Trisomy 21, Down's Syndrome* and *Down Syndrome* are all possible synonyms for the same topic. The MeSH term Down Syndrome covers all of the variations - saving you from having to type them all into your search.
- *Krebs Cycle, Tricarboxylic Acid Cycle,* and *Citric Acid Cycle* are all possible synonyms for the same topic. The MeSH term Citric Acid Cycle covers all of the variations - saving you from having to type them all into your search.
- Lung cancer, lung tumor, lung neoplasm, and pulmonary cancer are all possible synonyms for the same topic. The MeSH term Lung Neoplasm covers all of the variations - saving you from having to type them all into your search.

2. MeSH indexing increases the discoverability of citations. If a citation has no abstract or otherwise does not effectively convey the topic(s) discussed in the article, MeSH indexing allows for discovery of this citation even by basic keyword searching.

For example:

I run a basic search for chemoembolization and hepatocellular carcinoma. I am able to find the citation below (PMID: 25376280) only thanks to the MeSH indexing. Since the term chemoembolization does not appear in the title, abstract, or any other field, prior to when this citation was indexed for MEDLINE it would be missed by my search for chemoembolization and hepatocellular carcinoma. Only because the MeSH term Therapeutic Chemoembolization has been applied can I locate this record using these search terms.

3. MeSH indexing facilitates searching of both the broad and the narrow simultaneously due to the existence of the MeSH hierarchy. MeSH Headings, Subheadings and Publication Types are organized in hierarchies, or "MeSH trees".

PubMed Simple Search

Most of the time, you'll search PubMed by simply entering your search terms in the search box.

But PubMed does more than just search for those words. It also uses **Automatic Term Mapping** to search for synonyms to your search terms in the MeSH vocabulary. Then it searches for your terms and those synonyms **in all the fields** (author, journal title, article title, MeSH heading, author keywords, abstract, publication date, etc.) used to describe an article.

Automatic Term Mapping

Automatic Term Mapping (ATM) is a key feature of PubMed's search formula since this mapping enables more comprehensive search results than other search interfaces.

The Automatic Term Mapping process adds subject heading ***words*** from the MeSH thesaurus to your search in **all fields** of every PubMed record, including those that are not indexed for MEDLINE.

First, ATM compares terms from your search query with MeSH terms, journal titles, author and investigator names. It uses a **MeSH translation table** to "map" your search words or phrases to MeSH headings or subheadings. If a match is found in the MeSH translation table:

1. The term will be searched as MeSH term
2. PubMed will add any specific terms indented under the MeSH term in the MeSH hierarchy
3. PubMed will search the words that make up the MeSH terms in all fields of the PubMed record.

Example: When you search for *heart attack*, PubMed maps your query to the MeSH "Myocardial Infarction".

- PubMed then adds a search for the MeSH term "Myocardial Infarction" in **all the MEDLINE** records in PubMed.

- And, PubMed searches for **all MEDLINE** citations indexed with five more specific MeSH terms found below Myocardial Infarction in the MeSH Hierarchy, e.g., "*Myocardial Stunning*" and "*Shock, Cardiogenic*". (See the screenshot, right.)

- In addition, PubMed searches *heart attack, myocardial infarction, cardiogenic shock, myocardial stunning, etc.* as text words in **all fields of all the records in PubMed**.

MeSH Search vs. Basic Search

- **A MeSH search retrieves *subjects,* not words:** When you search with a MeSH term, you restrict your search to MEDLINE citations indexed with that subject heading.
- It's true that PubMed's basic search is fast, easy and often very successful. **Automatic Term Mapping *usually*** identifies the appropriate **MeSH terms** associated with your search concepts.
- However, ***restricting*** your search to ***selected* medical subject headings (MeSH)** can provide much needed focus and precision.
- In this module, we'll review **when** it may be best to do a MeSH Search, and we'll go over using the **MeSH Database** as a **tool** to build a MeSH search and launch it in PubMed.

Consider a MeSH Search If...

You need more precise results in a subject search. For example:

1. **Your basic search results are too large and not focused on your main concepts.**

In a basic search, your search terms (and the synonyms found by Automatic Term Mapping) will be found in all the fields of a record, including ones where your search term only mentioned in the abstract. A **MeSH search** is a type of **field search**, and like any search using field qualifiers, it will retrieve **fewer results** than a similar text word search. More importantly, in a MeSH search, PubMed restricts your results to **articles indexed with a subject heading for your topic**.

2. A **large amount of literature** has been published on your topic.

A MeSH search enables you to restrict your search to **Major Topic Headings** only. This allows you to retrieve articles where your topic is a major point discussed, rather than a secondary focus or finding.

3. You need to **disambiguate** a search word or phrase.

- Example: Searching with the word "aids" retrieves articles on AIDS virus, as well as articles on hearing aids, audiovisual aids, clinical aids, teaching aids, etc. Using the MeSH term for AIDS: **Acquired Immunodeficiency Syndrome [MeSH]** will limit your retrieval to the relevant subject.

- Example: Searching with the word *expression* retrieves articles about gene expression, but also facial expression, verbal expression, etc. Using the MeSH term **"Gene Expression" [MeSH]** will disambiguate your search and limit your retrieval to the relevant subject.

Consider Using MeSH Subheadings if...

- If you need to focus on a specific aspect of a topic, consider using a MeSH subheading.

- MEDLINE uses a combination of MeSH headings and coordinated subheadings to describe a concept as specifically as possible. Use MeSH with subheadings to target your retrieval on one aspect of a larger topic such as "Etiology of Sickle Cell Anemia", "Genetics of Turner Syndrome" or "Biosynthesis of RNA"
- When your topic contains the word "of", consider selecting MeSH and MeSH subheadings for your search.
- Although the subheading field can be searched separately, subheadings are usually "attached" to MeSH descriptors to describe an aspect of that topic. .

MeSH will Probably NOT Help You If...

- Your topic is a **new** or **emerging** concept for which a MeSH term does not yet exist.
- You suspect that **very little** has been published on your topic - meaning, again, there is probably no MeSH term.
- Your topic is a **gene**, unless it is a very heavily studied gene such as BRCA1 (most genes do not have MeSH terms).
- You want to retrieve **recently published articles**. The newest articles in PubMed may not yet be indexed for MEDLINE. There is a short lag time (a few days to many weeks) between when citations enter the PubMed database and when they are described with MeSH terms.
- An article you need is **not indexed for MEDLINE**. PubMed includes over 1.5 million articles that are not indexed with MeSH for MEDLINE

Remember .....

- A MeSH search is a subject search.
- A MeSH search usually results in a smaller retrieval than a basic text word search. Selecting MeSH terms limits your search to MeSH fields.
- MeSH will not usually help you if you need to research a new or rare topic or the most recent articles on a topic.

- If MeSH doesn't help with a search, do a basic search using AND, OR and parentheses.

MEDLINE, PubMed, and PMC (PubMed Central)

MEDLINE® is the National Library of Medicine® (NLM®) journal citation database. Started in the 1960s, it now provides more than 22 million references to biomedical and life sciences journal articles back to 1946.

MEDLINE includes citations from more than 5,600 scholarly journals published around the world. In addition to the comprehensive journal selection process, what sets MEDLINE apart from the rest of PubMed is the added value of using the NLM controlled vocabulary, Medical Subject Headings (MeSH®), to index citations.
PubMed has been available since 1996. Its more than 25 million references include the MEDLINE database .
PubMed citations often include links to the full-text article on the publishers' Web sites and/or in PMC and the Bookshelf. MEDLINE is the largest subset of PubMed.

PMC (PubMed Central) launched in 2000 as a free archive for full-text biomedical and life sciences journal articles. PMC serves as a digital counterpart to the NLM extensive print journal collection; it is a repository for journal literature deposited by participating publishers, as well as for author manuscripts that have been submitted in compliance with the NIH Public Access Policy and similar policies of other research funding agencies.

Internet and Evidence-Based Medicine

Evidence-Based Medicine (EBM) can be defined as the integration of individual clinical expertise with the best available external clinical evidence from systematic research .

The Need for EBM

In the years after you graduate, two things will happen:

1. Your memory of what you learned in medical school will lose its freshness.
2. New treatment methods will be found that they never taught you about in school because they didn't exist.

If you are to remain a good doctor, or become a better one, you need to stay on top of new developments as they occur. Evidence Based Medicine provides you with the tools you need to find important new medical research quickly and easily, and to work out its implications for your practice.

The Benefits of EBM

1. The total amount of knowledge out there is far greater and often more reliable than the clinical experience of one physician or even a group of experts. You no longer need to read through masses of journals in order to take advantage of it. It is no longer your job to know everything, even in your chosen specialty. It IS your job to be able to find the information as and when you and your patients need it.

2. A detailed and exact knowledge of the outcomes of different interventions, derived from the research, can often save lives.

- **PROBLEM: Practitioners must deal with an** explosion of available medical literature.

FACT: In order to keep up with the 7,827 relevant articles published monthly, a family medicine physician would need to dedicate 627.5 hours to reading the medical literature.[1]

EBM SOLUTION: Consulting critically appraised evidence-based review resources helps reduce the necessary time expended on collecting, reading, and evaluating medical literature.

EBM RESOURCE: The ACP Journal Club provides access to succinct enhanced abstracts for individual articles and studies that are indentified as being methodologically sound and clinically relevant.

- **PROBLEM: Practitioners must keep up to date with current research**.

FACT: Medical research is continually discovering improved treatment methods and therapies.

EBM SOLUTION: Practicing EBM helps keep practitioners up to date on current evidence and practice guidelines.

EBM RESOURCE: ACP PIER (Physicians' Information and Education Resource), an electronic evidence-based textbook, provides easy access to continually updated clinical evidence.

- **PROBLEM: Research findings are often delayed in being implemented into clinical practice**.

FACT: Did you know that it takes on average 17 years for clinical research to be fully integrated into everyday practice.[1]

FACT: Prior to the early 1990's, it was recommended that infants sleep on their stomachs despite evidence available in the 1970's that this contributed to Sudden Infant Death Syndrome (SIDS).[2]

EBM SOLUTION: The constant advancement and development of EBM resources, which take into account evidence from a wide variety of

fields, provide clinicians with the opportunity for greater exposure to clinical evidence.

EBM RESOURCE: The Cochrane Database of Systematic Reviews provides access to highly developed systematic reviews that integrate evidence from a broad spectrum of resources and that critically appraise and succinctly summarize the best available medical literature.

- **PROBLEM: Lack of familiarity with primary research can result in unnecessary clinical trials and possible harm to research subjects**.[1]

FACT: 64 clinical trials involving the drug Aprotinin between 1987 and 2002 continuously found that the drug lessened bleeding during surgery, but only 20% of previous studies were cited by researchers.[2] Because later researchers were unaware of research that came before, they may have denied a proven therapy to a control group.

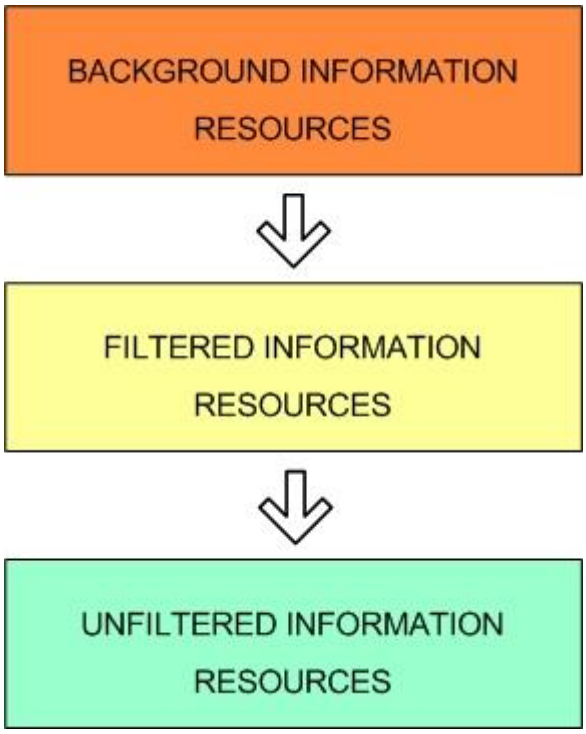
EBM SOLUTION: A careful and critical literature review should be carried out prior to engaging in clinical research.

EBM RESOURCE: Medline (Ovid or PubMed) searching with the results limited to Clinical Trials will provide a fairly complete representation of previously

completed clinical research.

Clinical Evidence Resources

EBM Resources can be divided into three major categories:



A- Background Information Resources

Where do I start?

Background Information Resources are a great place to start the EBM process. They provide broad overviews of medical topics, which help increase your understanding of the topics and acquaint you with the related evidence-based literature.

Examples of Background Information Resources:

1- Evidence-Based Practice Guidelines and Consensus Statements
Evidence-Based Practice Guidelines and Consensus Statements are carefully considered treatment guidelines, often published and updated by government or professional associations, that represent the preferred or gold standard treatment strategies for common diseases.

- The Agency for Healthcare Research and Quality (AHRQ) is a great starting point.

2- Evidence-Based Topic Overviews
Evidence-Based Topic Oveviews broadly summarize the available

evidence-based literature on topics without specifically focusing on a particular clinical question.

- American College of Physicians' *ACP PIER*, an e-textbook and BMJ's *Clinical Evidence*, are two valuable e-textbooks for Evidence-Based Topic Overviews.

B- Filtered Information Resources

I have the background information down. Now what?

Once you have a solid understanding of your topic next investigate Filtered Information Resources. These resources sometimes also called **"digested" or "synthesized" resources** are structured to save you time and effort by providing varying levels of analysis.

Examples of Filtered Information Resources:

If you are looking for quick access, freely available, evidence-based information then search one of the resources below. Each resource offers systematic reviews that will give you the best course of action for your particular patient, though if no systematic review has been carried out on your topic you might select a lower form of evidence.

- DARE (Database of Abstracts of Reviews of Effects)

DARE (Database of Abstracts of Reviews of Effects) is focused primarily on systematic reviews that evaluate the effects of health care interventions and the delivery and organisation of health services.

- Cochrane Library

The Cochrane Library contains high-quality, independent evidence to inform healthcare decision-making. It includes reliable evidence from Cochrane and other systematic reviews, clinical trials, and more.
less...
Cochrane reviews bring you the combined results of the world's best medical research studies, and are recognised as the gold standard in evidence-based health care.

- TRIP

TRIP is a useful database for locating health research. It enables cross-searching of a wide range of evidence-based resources.

- NICE Evidence Search
  -

The National Institute for Health and Care Excellence (NICE) provides national guidance and advice to improve health and social care. Enhanced access for SHU students on courses with placements in the NHS.
more...

- PubMed Clinical Queries

Citations for systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine.

The Cochrane Database of Systematic Reviews provides full-text access to Cochrane Systematic Reviews

2-Non-Cochrane Systematic Reviews
A Systematic Review in general is "an overview of primary studies that used explicit and reproducible methods".[1]

- The Database of Abstracts of Reviews of Effectiveness (DARE) critically assesses systematic reviews from a variety of medical journals.

3- Critically Appraised Articles
Critically Appraised Articles analyze a single research article, judge its validity, and publish an enhanced abstract of the article.

- ACP Journal Club offers enhanced abstracts of studies identified as being methodologically sound and clinically relevant

B- Unfiltered Information Resources

There was no Filtered Information on my topic. What next?

If there is no filtered information on your topic or that fits your specific patient you will need to utilize individual journal articles and studies. However, because generally journal articles and studies are not evaluated you will need to analyze your found articles and studies to determine their quality.

Examples of Unfiltered Information Resources:

1- Journal Articles

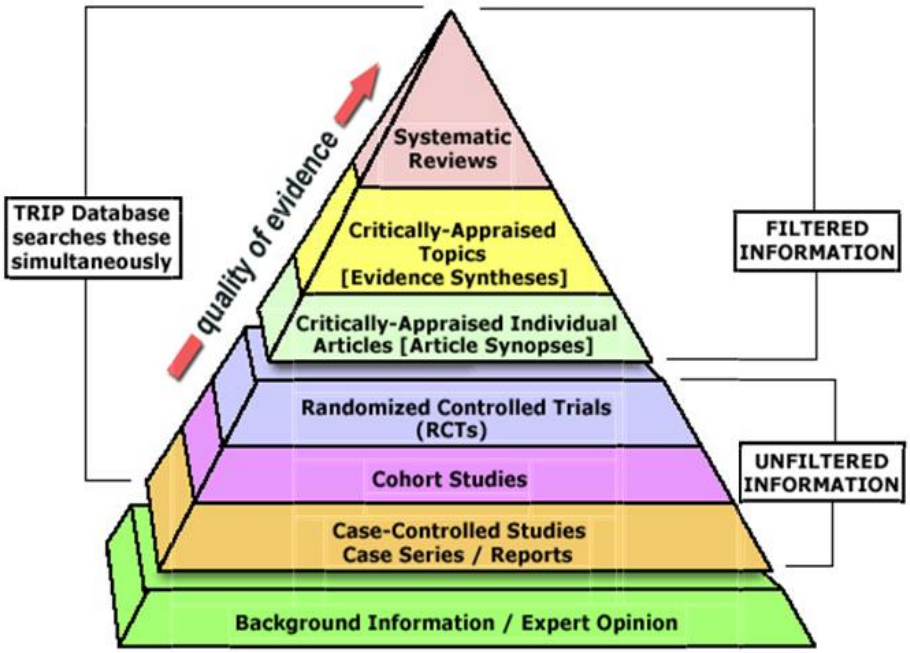
Research articles found in journals often investigate one topic in detail and require critical evaluation on the reader's part.

- MEDLINE is the premier source for biomedical journal articles. MEDLINE is available through BUMC MEDLINE Plus/Ovid or PubMed.

2- Randomized Controlled Trials

Randomized Controlled Trials (RCT) randomly assign participants into control or experimental groups to provide unbiased assessment of an intervention.

- When using MEDLINE you are able to restrict your searches to RCTs.



Searching for the Evidence

- **Textbooks/Handbooks, etc.** for electronic resources check MDConsult link and StatRef link; also consider Scientific American Medicine available via HML
- **Practice Guidelines**
  - **Definition**: "systematically developed statements to assist practitioner and patient decisions about appropriate health care **for specific clinical circumstances**." Source: National Academy of Sciences. Institute of Medicine.
  - National Guideline Clearinghouse
  - free resource for evidence-based clinical practice guidelines.
  - sponsored by the Agency for Healthcare Research and Quality in partnership with the American Medical Association and the American Association of Health Plans.
  - MEDLINE; search topic; select limit; look under publication types for "guideline"
- **Systematic Reviews**
  - **Definition**: "written by reviewers who use explicit and rigorous methods to identify, critically appraise, and synthesize relevant studies from the published medical research." Source: Nesbit, Evidence Based Clinical Practice Tutorial.
  - **Cochrane Database of Systematic Reviews**
  - prepared by the Cochrane Collaboration; abstracts FREE
  - Full-text reviews
  - search via HML's OVID EBM Reviews Cochrane Database
  - **DARE** (Database of Abstracts of Reviews of Effects)
  - includes structured abstracts of systematic reviews published in medical journals that have been critically appraised by reviewers at the NHS Centre.
  - search via HML's OVID as a separate database OR search in OVID MEDLINE and limit to " Article Reviews (DARE)"
  - **Bandolier Evidence-based Health Care**
  - a monthly Internet journal that synthesizes the information from systematic reviews and meta-analyses
  - free searchable database
  - **Meta-analysis**: A kind of systematic review. "A quantitative method of combining the results of independent studies (usually drawn from the published literature) and synthesizing summaries and

conclusions which may be used to evaluate therapeutic effectiveness, plan new studies, etc., with application chiefly in the areas of research and medicine. " Source PubMed MESH Browser

- Search MEDLINE Use limit option. Under publication types, select meta-analysis, with your subject search.

- **Critically Appraised Research Articles**
  - Definition: critiques of published research articles. In OVID databases on the summary screen; these are easily identified by the caption "Article Review"
  - Search OVID MEDLINE as follows: Search your subject and limit to "All EBMR Article Reviews"
  - **ACP Journal Club**
    - Publication of the American College of Physicians
    - purpose is to select from the biomedical literature those articles reporting studies and reviews that warrant immediate attention by physicians attempting to keep pace with important advances in internal medicine. These articles are summarized in "value added" abstracts and commented on by clinical experts.
    - Editorials and Resource Corner full-text articles; searching tips, etc.
  - **Evidence Based Medicine and EBM Online**
    - co-publication of the BMJ Publishing Group and the American College of Physicians-American Society of Internal Medicine
    - purpose of this secondary journal is to alert clinicians to important advances in internal medicine, general and family practice, surgery, psychiatry, pediatrics, and obstetrics and gynecology by selecting from the biomedical literature those original and review articles whose results are most likely to be both true and useful. These articles are summarized in value-added abstracts and commented on by clinical experts.
  - Other sources of critically appraised research articles
    - InfoPOEMS (Patient Oriented Evidence that Matters) Published by Journal of Family Practice.

- **General Databases**
  - **TRIP**--Turning Research into Practice meta-search engine that searches across 55 sites of high-quality medical information
    - Results are sorted by Evidence Based Links (direct and indirect); peer-reviewed journal articles; guidelines.
    - Searches words in the titles and text only; must search on synonyms
    - Free

- **SumSearch** from University of Texas Health Science Center at San Antonio
  - Metasearch engine which searches the Emergency Medicine, Medline, National Guideline Clearinghouse and Cochrane Database and DARE.
  - Returns results in one search
- **MEDLINE database**
  - Use OVID's Limit "Evidence Based Medicine Reviews"t or PubMed's Clincal
-

What Is Your Question?

Before starting an EBM search, you must have a clear idea on the type of information you are looking for. What type of intervention, if any, do you want to explore?
One good way of doing this is to apply a set of questions to the clinical problem. This is called PICO, which stands for:

P	**Patient or population**	**Describes patient (age, sex, race, past medical history, etc.)**	**A 50 year old woman with a family history of breast cancer**
I	**Intervention**	**What happens or is to be done; treatment, diagnostic test, exposure, screening**	**Hormone replacement therapy**
C	**Comparison**	**Compared to what? Nothing, placebo, gold standard, another intervention**	**Placebo**
O	**Outcomes (preferably clinical)**	**What is the effect of the intervention? (Be specific: mortality after a particular time,**	**Prevention of Alzheimer's Disease**

ECLIPSE

ECLIPSE is a good for developing **health care management and improvement** questions.

Expectation

What do you want to find out? What do you want to use the information for?

Using of Social Networks and Publishing Facilities to Build Your Online Profile

Client group
Who is the service/improvement you are asking about aimed at?
Location
Where is the service/improvement of interest located?
Impact/Improvement
What is the change in the service which is being looked for? What would constitute success? How is this being measured?
Professionals
Who is involved in providing/improving the service?
Service
For which service are you looking for information? For example, outpatient services, nurse-led clinics, intermediate care.
An example question in this format would be:
"How can we improve procedures for nurses, community staff and social care workers when discharging patients with head injury from hospital to the community for continued rehabilitation?"
SPICE is good

SPICE

SPICE is good for formulating questions about qualitative or improvement research. (Qualitative research is generally when you want to explore perspectives or opinions about a topic)
Setting
What is the setting the project is taking place in?
Population
Who is the project about? What are the defining characteristics of involved patients? (e.g. a particular age, condition or ethnic origin)
Intervention
What is happening to the population group outlined above? Are you introducing a particular drug or therapy? What kind of improvement programme are you thinking about implementing?
Comparison
What would you like to compare your intervention to? This might be a group where you have not introduced the drug, therapy or improvement programme.
Evaluation
How might relevant studies have evaluated their success? What would you want to evaluate about your planned intervention?

Activity	Tools/Processes
cademic Profiles	**Academic.edu** Academia.edu allows you to update your status, upload your academic papers (including unpublished drafts), list your research interests and follow other scholars with similar areas of research.
	Research Gate ResearchGate is the leading social networking site for scientists and an increasing number of scholars in humanities and social sciences. It offers the same functionality as Academia.edu: share publications, get statistics about views and downloads of your research; collaborate with peers, etc.
	Mendeley Mendeley is a social reference management site. You can list or upload your research publications, provide a brief academic CV and biographical information, and participate in a group.
	Google Scholar Google Scholar Citations provide a simple way for authors to keep track of citations to their articles. You can check who is citing your publications, graph citations over time, and compute several citation metrics. You can also make your profile public, so that it may appear in Google Scholar results when people search for your name.
	LinkedIn LinkedIn is a social networking site with a focus on job recruiting. However, it's not all business. Many scholars use LinkedIn to show off their academic service. If you're investigating a non-traditional career, or even if you just want to ensure discovery of your CV by university administrators and support staff, LinkedIn can be an important complement to your other social networking activities.
Research er IDs	**ORCID** OrcidID provides a unique identifier for each researcher. Having a distinctive author name is essential for academics' work to be found among a global network of researchers. ORCID is required by a growing number of agencies and publishers such

	as Oxford University Press, Taylor & Francis, Public Library of Science (PLoS) and Thomson Reuters.
	ResearcherID ResearcherID operates in Web of Science, offering a unique scholar identifier within Web of Science and a scholar profile page with citation metrics for each researcher.
Content Sharing	**Twitter Hashtags & Lists** The microblogging platform Twitter allows you to use hashtags to discover important news in your discipline or other active scholars. It is increasingly common for conferences to have an associated hashtag so make sure to check if there is one when you attend your next meeting.
	Slideshare Slideshare allows you to archive your slides online and can give people an early glimpse into your research. This will help maintain your active research presence after the presentation and build interest in your future publications.
	Digital Repositories Many academic libraries are actively involved in building digital repositories of the institution's books, papers, theses, and other works. As a member of UBC you can “archive” your work in the UBC Library institutional repository cIRcle. If you've published an article in your field, you may also want to explore archiving in a subject repository.
	Open Education You can leverage all the time you spend teaching by publishing your teaching materials online for others to use in their own instruction. Open Education Resources (OER) can include, but are not limited to, syllabi, reading lists, handouts and course readings, PowerPoint slides, and even videos.

	Open Bibliographies Open bibliographies is the act of sharing citations on a specific theme or topic on the internet. This curated list of materials can be a useful starting point for other researchers while also directing people to your knowledge in the area of study. Open bibliographies can be created using citation management tools, or through blogs, wikis or personal websites.
Content Creation	**Blogs, podcasts, videos** Blogs are a space where academics and scholars engaged in new ideas, begin discussions on research findings, and gain feedback on pre-published materials. Videos and podcasts allows you to capture presentations that may be dependent on audiovisual materials for expressing ideas, discussion periods that can add clarity to your work, and nonverbal skills associated to effective presentation.
	Twitter Twitter is a popular microblogging service. The service provides access to current updates in your discipline, as news services and academic journals broadcast breaking news over Twitter. One distinct advantage of Twitter is the ability to reply to journalists and scholars in your field and to easily repost links to articles through your own account.

Chat-GPT

Artificial Intelligence & Academic Integrity

Prof. Ahmed-Refat A.G Refat

- **Artificial intelligence (AI)** is "the ability of a digital computer or computer-controlled robot to **perform tasks** commonly associated with intelligent beings."
- **A chatbot** is a tool driven by **AI,** automated rules, machine learning (**ML**.) and natural-language processing (**NLP**),.... can ..**respond** to requests of all kinds."
- **Generative AI** (**GAI**) uses generative modeling and advances in **deep learning (DL)** to **create/ produce** diverse content at scale by utilizing existing media such as text, graphics, audio, and video."

ChatGPT works by using a deep learning network trained on big data to generate responses to prompts. ChatGPT generates text **based on…. patterns it recognizes in the data it was trained on**, producing human-like responses that are relevant to the prompt.

ChatGPT generates text **based on…. Recognizing Patterns In The Data It Was Trained On**, producing human-like responses that are relevant to the prompt.

- **Generative AI tools**
- ChatGPT (conversational tool)
- Google Bard (conversational tool)
- MS Bing (use 'creative mode' for GPT 4)
- Claude (conversational tool)
- DALL-E (**image** generator)
- Midjourney (**image** generator)
- HeyGen (**video** generator)
- Perplexity (information sharing and discovery)

- **Chat-GPT (Chat Generative Pre-trained Transformer)** is a chatbot developed by OpenAI and launched on November 30, 2022.

Search Engines Vs Generative AI

Search engines

- Traditional **search engines as Google**, Library Search or databases, work by searching for information based on the **keywords you enter**. The search tools match your keywords to the words used to describe content and **give you a list of potential sources read, valuate and to** compose.

Generative AI

- **AI tools do is not just a search for information, they also find and present information for you. You enter your prompt or question, and the response is a unique answer.**
- **A source of information has been generated for your purpose alone. You do not need to follow links to online materials .**
- **How is GAI creating information?**
- **Generative AI text tools are computer programs trained on a large language model.**
- That means these programmes have been trained by consuming large amounts of text from books, articles, and websites, which the programme then analyses to **find patterns and relationships between words and longer text.**

How is GAI creating information?

- This intelligence is based on a **recognition of patterns rather than an interpretation of meaning or what the words actually say.**
- **The text responses are built word by word, phrase by phrase, based on what is most likely to come next and what 'fits'.**

Current GAI Applications

1.Language models:

- Translation
- Creative, academic, and business writing
- Code writing
- Genetic sequencing
- Grammatical correction or analysis

2.Audio and speech models:

- Composing and songwriting
- Dubbing
- Dictation and transcription
- Speech and voice recognition
- Sound editing

3.Visual and imagery models:

- Illustration
- Infographics
- 3D modeling
- Creative design
- Image editing
- Architectural rendering .

4.Data generating models:

- Creating synthetic data on which to train AI models.

Healthcare and scientific research

- Scientists can use AI to
- Model Protein Sequences,
- Discover New Molecules,
- Or Suggest New Drug Compounds To Test,

- Doctors And practitioners can use AI to analyze images to aid in diagnoses.

For students

- Students can get
- **personalized & real-time tutoring**
- which can make them understand complex concepts better and improve their grades.
- **For educators**
- For educators, AI can provide assistance in creating lesson plans, presentations, and other materials, can help them to grade student work, and even assist them in creating their syllabus, quizzes and exams. It can also help educators to evaluate student progress and provide personalized feedback.

For educators

- **Using Chat GPT shall result in**
- *less workload* for teachers
- create *spare time* for them
- to *interact more with their students*
- **For professionals**
- AI can help them to improve their productivity, by assisting in tasks such as scheduling meetings, writing reports, and creating presentations.
- It can help them to make better decisions by providing them with insights and predictions, and even help them to communicate more effectively .

Limitations

- **ChatGPT can make mistakes. Consider checking important information. AI tools can not apply human critical thinking or the development of an evidenced argument:**

AI performs better when it has more sources to draw on, so **if you are looking for assistance with more specialised or niche areas, or cutting edge research, the information may not be so well developed**.

the **data is not always current** and tools may be drawing on sources that are months or years out of date . Many AI tools are **unable to reference their sources and you will find that citations are often fabricated.**

Hallucinations

ChatGPT can generate irrelevant, incorrect, or nonsensical responses known as "hallucinations." For instance, if ChatGPT is asked for historical information beyond its training data **or** about future events, it might *generate* ***plausible but incorrect responses.*** **if the dataset is biased this bias will be transferred into the generated content**. Without careful analysis, biases, stereotypes and in some cases Western perspectives may be perpetuated

- Since human **emotions** do not play any role in working Chat GPT, complex problems involving human beings might get **dis-compassionate** solutions.
- Thus **eroding empathy** and disturbing human relations.

Misinformation

- AI models can spread misinformation if they generate false or misleading responses.
- For example, if ChatGPT is asked about a conspiracy theory, it might **unintentionally** provide a response that seems to validate that theory, leading to the spread of false information
- **Security of data** Data fed into the system can render vulnerability, and there could be a ***severe security risk***.
- **Chatting …Cheating:** "students [**may**] use [ChatGPT]as a ***cheating tool*** instead of a supporting tool to improve their learning" and that AI **prevents students from thinking critically by keeping them in their comfort zone**.

Is Chat GPT the end of thinking skills?

If students become over reliant on Chat GPT, their independent critical thinking and *problem-solving skills may **deteriorate***. Over time, students may ***lose*** the ability to think outside the box and generate original ideas. If students rely excessively on Chat GPT for answers and solutions, *they may become **less motivated to learn** independently, thus diluting human **intelligence** over generations.*

Evaluate the responses of AI Generative Tools

1. Cross-check the response and do lateral reading

- As with any information source, **don't accept generative AI responses at face value.**
- Cross-check the information with other sources.
- Read some easily accessible online sources or some reference sources .
- Do they contain the same information and conclusions?
- Do they confirm what the response claims?
- Looking at multiple sources in this way, to compare and contrast what they are saying, is called **lateral reading**, and it's a useful technique .

2. Verify that references are real

- Search for any references included in the response in Google Scholar. Does the book or article exist? Are the publication details correct?

3. If they are real, check that they support the response

- It is common to find that although the references may be correct, on closer reading the source has been misrepresented in the response. Take time to check that the cited sources are about what the AI tool claims.

Generative AI is not Primary Source of Information

Generative AI tools, are not primary sources of information. Gen.AI do not independently verify the facts, understand context, think, or feel like humans.

- **Think of Chat GPT as a starting point, much like Wikipedia**
- Think of Generative AI as a starting point, much like Wikipedia.
- While **Wikipedia isn't typically an acceptable citation for academic work, neither are generative AI tools.**

- They're great tools to begin your research, but they shouldn't be your main or only sources.

It's plagiarism Always turn to reputable, peer-reviewed scholarly materials for in-depth research. **And remember, copying and pasting content, whether from a website or AI-generated material, isn't permissible. It's plagiarism**.

How do you acknowledge the contribution of AI?

- **Acknowledging your use of AI Short statement "Declaration" You should add a declaration which**: Provides a **written acknowledgment** of the use of generative artificial intelligence

1. Specifies **which technology** was used
2. Includes explicit descriptions of how the **information was generated**
3. Identifies the **prompts used**
4. Explains how the **output** was used in your work.

- **Example 1:** I acknowledge **the use of** [insert AI system(s) and link] **to** [specific use of generative artificial intelligence]. **The prompts used** include [list of prompts]. **The output** from these prompts was used **to** [explain use].

- **Example 2:**If AI **was permitted** to be used in your assessment, but you have chosen ***not*** to use it, the following disclosure is recommended. **No content generated by AI technologies has been used in this assessment**.

COURSE SPECIFICATION

Course title:

Internet and Computer Application in Medicine

تطبيقات الكمبيوتر و الانترنت في الطب

- **Programme on which the course is given:**

  MD , All specialities, First Part

- **Department offering the course:**

  Public Health

- **Academic year/level:**

  MD , First Part

Course Coordinator:

Prof. / Ahmed-Refat Abdel Ghafar Ahmed-Refat

A- Basic information:

- **Title: Internet and Computer application in Medicine Code:**
- **Course duration: 4 months**
- **Total teaching hours: 32 hrs**
- **Lectures: 20 hrs practicl /small group sessions: 12 hrs**
- **Allocated marks:.100**

B-Professional information:

I. AIMS OF THE COURSE:

This course aims to consolidate the knowledge , skills and attitudes of the post-graduate medical students by providing the opportunity to learn more about using the concepts and methods of information and communication technologies (ICTs) in his/her medical practicing , dealing with clinical problems and to complete assignments, projects , thesis , and support self-directed learning.

II. INTENDED LEARNING OUTCOMES:

A- Knowledge And Understanding

- A-1- Define the commonly used terms and concepts of medical informatics
- A-2-illustrate the main sources of information on the internet (search engines, subject directories, and deep web)
- A-3-Describe the main citation styles of electronic sources.
- A-4-Identify the uses and scope of PubMed- Medline, MesH and medical databases
- A-5- Mention the steps of identifying search statements
- A-6- List the different aspects of plagiarism and the methods to avoid this misconduct

B- Intellectual Skills

- B-1- Locate the proper medical information source
- B-2- Create an effective search statement
- B-3-Interpret the retrieved results and decode urls contents
- B-4- Evaluate the validity of internet health information

C- Professional and Practical Skills

- C-1-Apply the principles and tools of evidence-based medicine in every day medical practicing
- C-2-Conduct a systematic review and critical appraisal of medical topics by using internet tools
- C-3-Prepare and upload a medical report ,fact sheet or power point presentation regarding the contemporary medical topics in a reputable site
- C-4-Cite the internet resources by using Vancouver style
- C-5- Applying for and attaining an e-learning simple and relevant course

D- General and Transferable Skills

- D-1-Communicate effectively with his/her colleagues, students, patients and the world-wide scientific community by using e-mails and other social web tools.
- D-2-Work as an active participant in the internet scientific groups/ forums
- D-3-Use the new collaborative internet tools and adopt the information and communication technologies in his/her career as a physician and lifelong learner.

E- Attitudes

- E-1-Consider the privacy aspects of data manipulation
- E-2-Participate effectively in social web tools
- E-3- Respect and promote health on the net code of conduct and netiqutte
- E-3-Consider the legal and ethical principles of avoiding plagiarism and copywrite violation

V. EDUCATIONAL RESOURCES

Information Literacy. ***Competency Standards*** for. ***Higher Education***.

https://alair.ala.org/handle/11213/7668

Media and information literate citizens: think critically, click wisely!

https://unesdoc.unesco.org/ark:/48223/pf0000377068

1.Information Literacy in the Disciplines: Medicine

https://www.ala.org/acrl/

2.. Framework for Information Literacy for Higher Education
http://www.ala.org/acrl/standards/ilframework

3. New York State, DeVry University (2022 – 2023 ACADEMIC CATALOG)

4.https://credoreference.libguides.com/c.php?g=971956&p=7024555
https://blogs.ntu.edu.sg/lkcmedlib

5.Writing with Internet Sources : A Guide for Harvard Students
https://nicspaull.files.wordpress.com/2011/04/writing_with_internet_sources-harvard.pdf